FOOD ENGINEERING

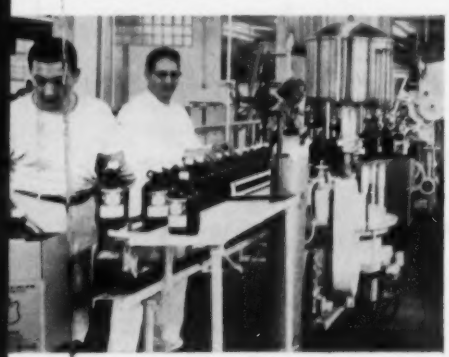
AUGUST 1956

A McGRAW-HILL PUBLICATION

PRICE 35 CENTS

PROCESSING • Fast candling on new mass maraschino line. p. 69

PACKAGING • Into 'unit' bottles go flavors for line of 95 drinks. p. 54



ENGINEERING • Lay's of Atlanta sets pace with striking new $1,800,000 show-place food plant. Special Report, starts p. 56

ALSO: PERSONNEL • SANITATION • MAINTENANCE
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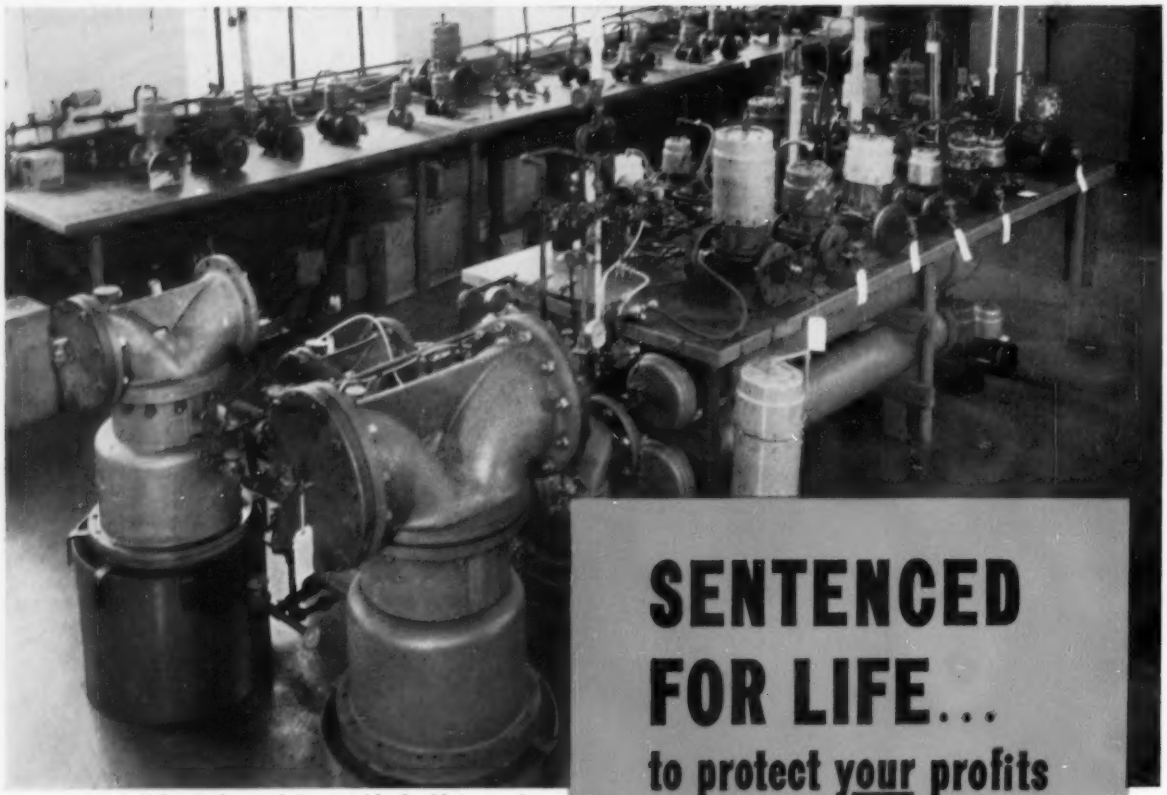

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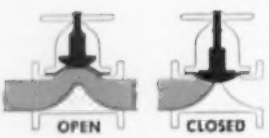

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AUGUST 1956

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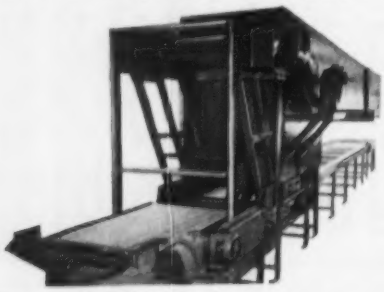
Exclusive new 2-stage filter continuously removes foreign particles; extends oil life. Filter available separately for existing fryers.



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Multi-Tier Cooler eliminates racks. Packs 196' of controlled cooling in only 15' of floor space. Automatic loading; built-in packing table.

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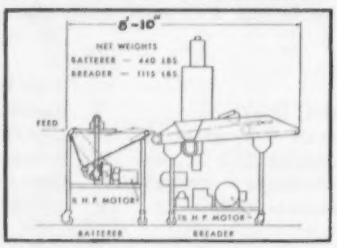

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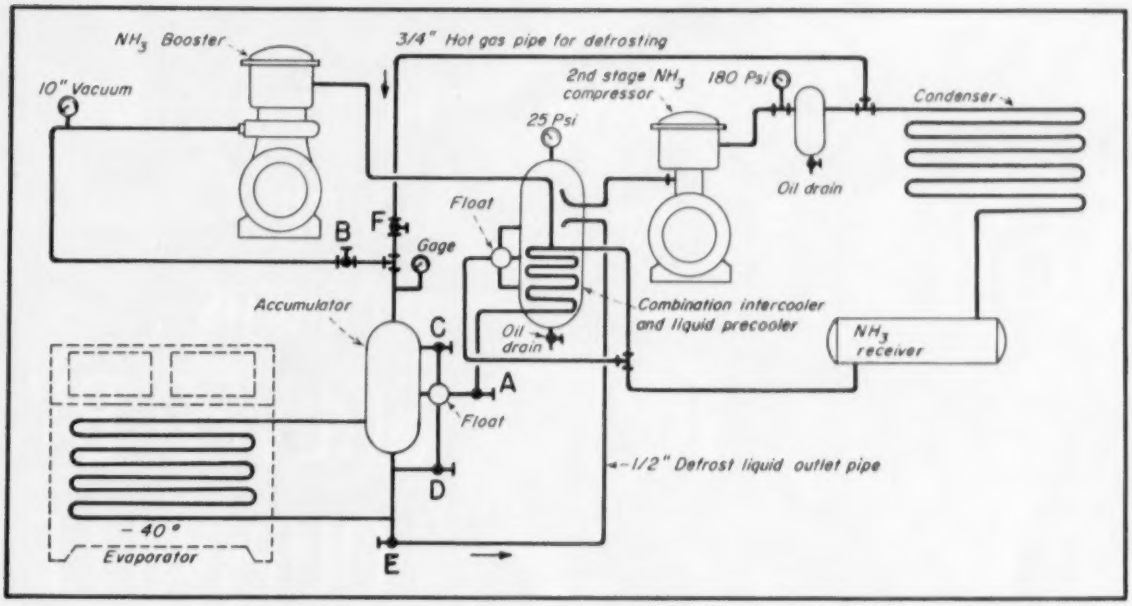

De-Oiling Refrigeration System

Until recently, we had considerable difficulty removing oil from the ammonia coils that provide refrigeration for our plant's 13 tunnel-freezers. Through each of these is circulated a cold blast (10,000 cu. ft. per min.).

The operating vacuum inside the coils, which are located in the tunnels, is usually 10 in.

But under these conditions, oil did not flow readily. Further, ammonia was drained off with what little oil was removed. Thus, even when the system was inoperative, oil removal from the coils was inconvenient, as well as difficult and messy.

Then we installed a system that not only permits effective removal of oil from the coils, but also improves operation of the defrosting cycle.

From the hot-gas line between the compressor and the condenser, a ¾ in. hot-gas pipe was run to the accumulator. Another line of ½-in. pipe was installed from the evaporator to the combination intercooler and liquid pre-cooler. The new hookup demonstrates these advantages:

1. It speeds defrosting.
2. The low-temperature operating area is not messed up by either oil or ammonia.
3. Since oil is cleansed from the system with each defrosting cycle, heat transferring is improved, and float-valve troubles have been minimized.
4. At both of the present oil discharge points (at intercooler and regular discharge from oil separator) temperature is high enough to insure a ready ammonia-free flow.

The system is operated in this manner:

To defrost, close the ammonia feed valve—(A) in sketch—the suction stop valve (B), and also the float-chamber equalizer valves (C) and (D), thus avoiding high pressure on the float.

The drain-valve (E) is then opened wide to permit the free flow of liquid and gas in the evaporator to the intercooler. Now, hot-gas valve (F) is open sufficiently to build up 60 psi in the coils. Normally defrosting requires only 10 to 15 min.

During operation, the intercooler will hold the ammonia which has been condensed. However, if there is more than one evaporator, and if the compressors are operating, the ammonia in the intercooler will be evaporated as fast as the air unit can be defrosted. Oil drainage is no longer a problem.—*G. M. Norton, Refrigeration Superintendent, Producers Produce Co., Springfield, Mo.*

Quickly Spots Electrical "Grounds"

Equipment is available for locating electrical-system grounds without de-energizing the system.

While such equipment is rather expensive, one GF plant has found its cost saved in a single year by elimination of production losses that would have occurred if grounds had to be located by tedious traditional methods. —*Technical Bulletin, General Foods Corp.*

FOOD ENGINEERING
(Formerly Food Industries)
August 1956 Vol. 28, No. 8

Published monthly by the McGraw-Hill Publishing Co., Inc.

Executive, Editorial, Advertising, and Subscription Offices: McGraw-Hill Building, 330 W. 42nd St., New York 36, N. Y. Publication Office, 99-129 N. Broadway, Albany 1, N. Y.; Second class mail privileges authorized at Post Office at Albany, N. Y.

Donald C. McGraw, President; Paul Montgomery, Executive Vice-President; Joseph A. Gerardi, Executive Vice-President and Treasurer; Hugh J. Kelly, Executive Vice-President; John J. Cooke, Secretary; Nelson Bond, Executive Vice-President, Publications Division; Ralph B. Smith, Vice-President and Editorial Director; Joseph H. Allen, Vice-President and Director of Advertising Sales; J. E. Blackburn, Jr., Vice-President and Circulation Director.

For subscriptions, write to Food Engineering Subscription Service, 330 W. 42nd St., New York 36, N. Y. Order must indicate company and position. Allow one month for change of address.

Subscriptions are solicited only from the executives, engineers, and technologists in food processing plants.

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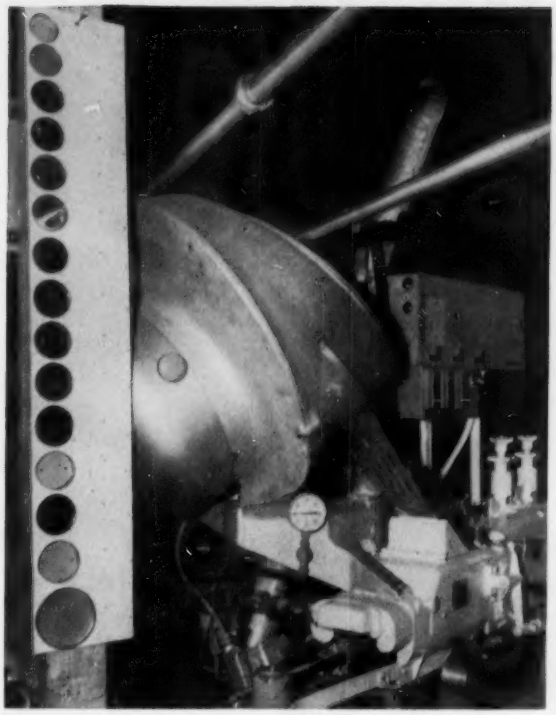


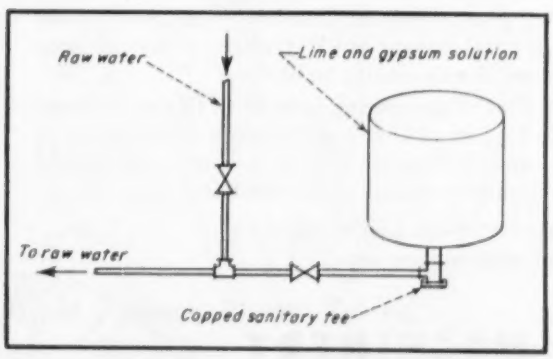
Cuts Errors at Capping Machine

With each run of product through our jar closing machines, instructions were issued on cap types and sizes.

Nevertheless, much time was lost due to mistakes in cap selection—until we installed a simple identifying system.

Onto a white plywood panel located adjacent to each closing machine, we nailed every cap (lip-side out) for every jar to be closed by the machine. And such information as size, type, make, and code number is posted beside the closures to identify each with the jar it fits.

As one result, time out due to wrong cap selection has been minimized.—*C. F. Fulton, Plant Engineer, Old Dutch Foods, Inc., Blasdel, N. Y.*

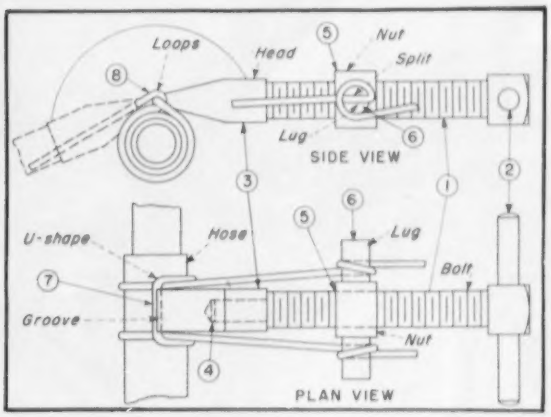


How to Reduce Lime Deposits

Those who have lost considerable time cleaning lime and gypsum pipes running from batch water treating tanks will welcome this method of cutting down the deposits:

First, make a connection to city water system (see sketch). Then after each batch of water is treated, have the operator close the valve from the liming tank and open the cross-over lines, thus allowing city water to flush out the pipes.

A capped sanitary tee at the discharge of the chemical tank will facilitate rapid emptying of the tank for cleaning.



Making Wire Hose-Clips

Efficient connections for securing small-diameter rubber hose to metal pipes have proved easy and economical to make—once the kind of tool shown here has been fabricated.

This device includes a central bolt–(1) in sketch—with a T-handle (2) driven through the head for turning the bolt. At the other end of the bolt is a wedge-shaped head (3) drilled at the thick end to form a bearing for the milled end of the bolt (4).

A third part of the tool is a nut (5) which has a pair of turned lugs (6) extending from each side. Each lug is split for the major part of its length—to allow the wire from which the clip is to be made to be inserted for a tight hold.

To make a clip, cut off a generous length of stiff steel wire and bend it in the middle to form a flat-bottom U-shape (7). Wire should then be bent around the hose and the loose ends slipped through the previously formed loop.

Now place the milled semi-circular groove in the narrow end of the wedge-shaped head, so as to engage with the wire. Loose ends of the wire are then fitted through a lug slot on either side of the nut, and secured thereto by winding them once or twice around the lugs.

Hold the nut with one hand while using the other hand to turn the bolt. This action causes the loose ends of the wires to be pulled taut, as the two loops forming the clip are tightened securely.

The action of the tool pulling on the wires, while its wedge-shaped end bears on the clip produces a very powerful compressive force on the hose. Therefore, excessive tightening will cause the wire of the clip to cut into the hose surface.

When a sufficient degree of tightness has been achieved, the clip is locked in place by swiveling the complete tool through approximately 180 deg., forming two loops (8). Now with a pair of pliers cut off the ends of the wire, and the connection is made.—*Clifford C. Bower, Tool Engineer, London.*

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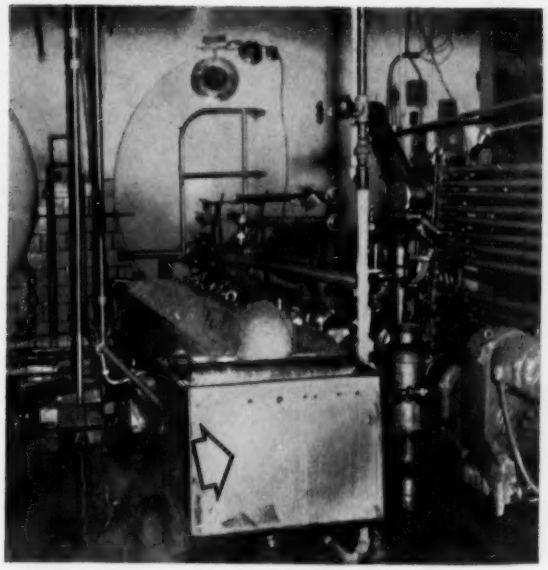
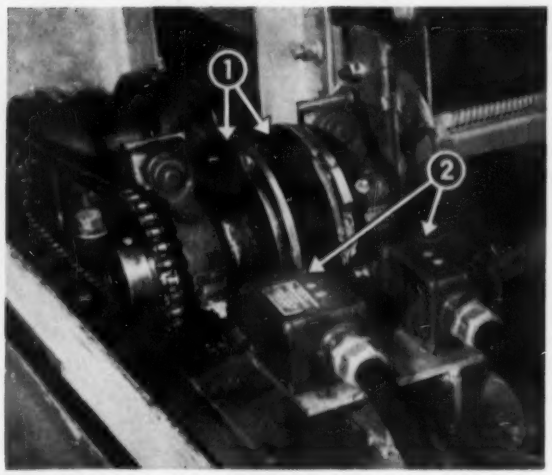


Special CIP Application

Consistently and rapidly as we can, we are extending our cleaned-in-place lines. Included first in the system are receiving lines, weigh tanks, and storage vats.

Recently, we added in our pipe sink. And results obtained were so satisfactory that we fabricated an extension onto one end of the sink (see photo) large enough inside to accommodate the disks of our cream separator.

Though at present we inspect and check pipe fittings and disks after CIP cleaning, considerable labor has been saved, and cleaning has been satisfactory—even the cleaning of the separator disks.—*W. H. Chadderdon, Production Manager, Arcade Farms, Co-op Inc., Blasdell, N. Y.*



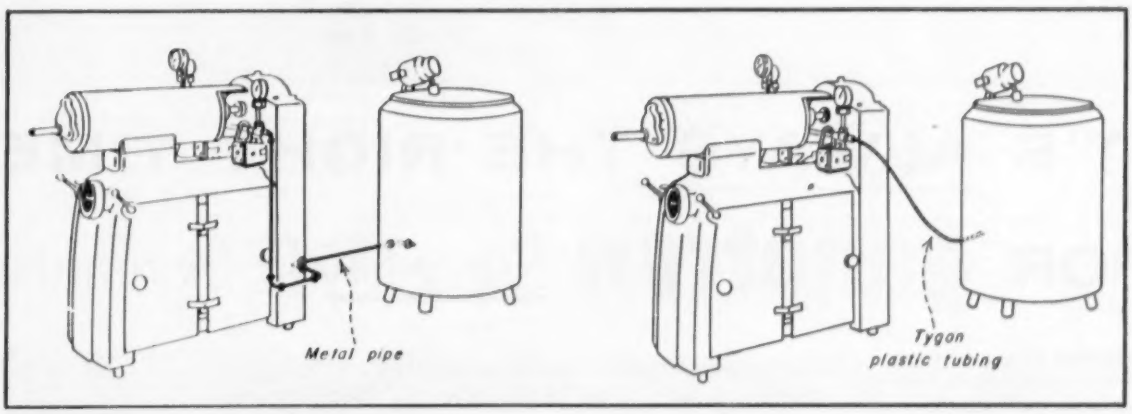
Conveyor Unload Control

To synchronize perfectly the action of the two tray unloaders in our dual discharge Read-Standard bread cooler, we have installed an unloader safety control.

We use tray-unloaders instead of tip trays. These complement our automatic conveyor-selector by unloading loaves upon the discharge conveyors in proper feed position for the slicers. This method eliminates need of an operator at the conveyors to straighten the position of loaves to be sliced (also see article, p. 44).

This control is comprised of two cams—(1) in photo—chain driven by a sprocket fixed to the drive shaft of the bread-cooler conveyor. The cams, which are synchronized with movement of the cooler trays, operate two limit switches (2). One of these actuates the two unloader-sweeps. The other holds this circuit open for 7 sec.—the

Turn page



Savings Through Plastic Tubing

Improvement in the ice cream freezing operation has been made at Swift & Co.'s Holland, Mich., plant. Here, $\frac{3}{8}$ in. clear plastic tubing (Tygon) has replaced the former metal pipe and fittings (see sketch) for carrying ice-cream mix from a holding tank to the continuous freezer.

It was found, in this instance, that transparent plastic tubing provides these three very worthwhile advantages:

1. The operator can now readily see whether or not the mix is flowing properly into the freezer.
2. No longer are five elbows required in the pipeline. Thus line friction has been reduced.
3. Cost of the Tygon tubing was considerably less than the metal pipe and fittings it replaced.—*"Circle," publication of Cherry-Burrell Corp., Chicago.*

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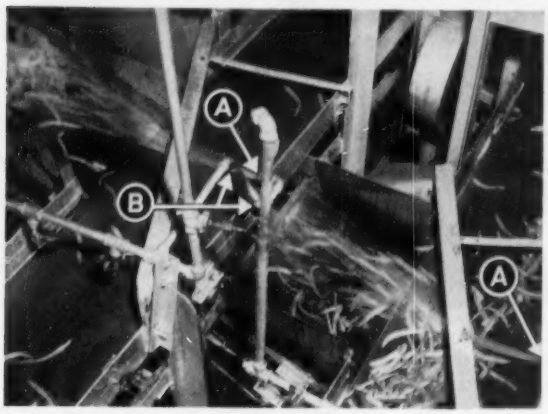
calculated time required for two trays to arrive at the unloading position and so complete the unloading cycle.

Motor operated, the two sweeps move in unison. The forward motion whisks bread from the two trays. The sweeps return then to their original positions, safely out of the way of the moving trays.

The safety control, in addition to positioning loaves properly, has eliminated possibility of equipment or product damage due to erratic mechanical operation.—*Charles McCord, Plant Engineer, Weber Baking Co., (Interstate Bakeries Corp.) Glendale, Calif.*



Novel Conveyor Transfer

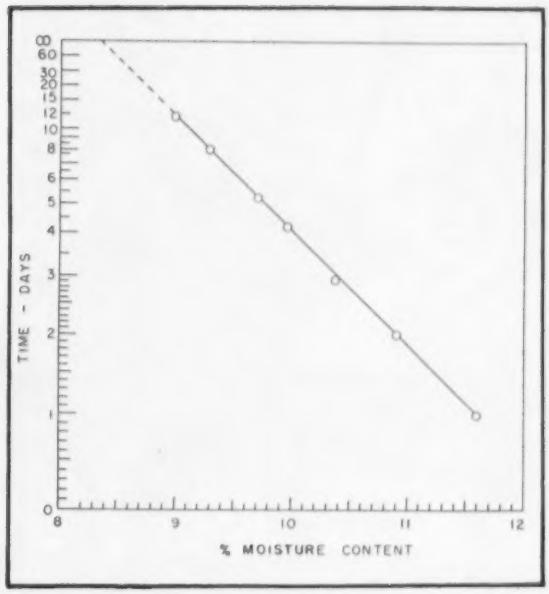
Sweeps, dividers, and other mechanical arrangements for satisfactorily dividing or separating most materials traveling upon a conveyor, do not have the same efficiency, we have found, when applied to snap beans.

Therefore, we experimented until we developed an arrangement which works very well.

Here's how this mechanism is constructed to divide the flow of snap beans on a conveyor and transfer a portion to another conveyor traveling at right angles:

Water was piped to the side of the conveyors where it was desired to transfer a part of the conveyor load onto another conveyor traveling beneath the first two and at right angles. Fishtail type nozzles—(A) in photo—were attached to the end of the pipes and positioned by the adjustment of a series of elbows (B).

The stream of water from the nozzles, when properly angled against the beans, sweeps a portion of them onto the conveyor beneath, which travels at right angles.—*Engineering Department, Seabrook Farms Co., Bridgeton, N. J.*



Handy Method of Plotting Data

A coordinate system in which graduations are proportional to the arc-tangent of the plotted values has been found quite satisfactory for rectification of many curves describing physical and chemical phenomena encountered in food research studies.

Here's a practical example of this method:

It was required to determine the moisture content, at equilibrium conditions, of a food held in a storage atmosphere. This content check, serving as an index of equilibrium, was determined after varying periods of storage—one, two, three, four, five, eight, and twelve days.

Data was then plotted on a linear-arc tangent coordinate system (see chart), with moisture content as abscissa on a linear scale and time of storage as the ordinate on an arc tangent scale.

Use of this method results in a linear plot. Extrapolation to infinity time (dotted line) indicates that the equilibrium moisture content of material is 8.33%. Experimentally, the moisture content was found to be 8.46% after 60 days of storage.

Advantages of this method are: Rectification of the plotted curve; ease of interpolation; ease of extrapolation, especially to zero and infinity; and the possibility of obtaining adequate information from limited data.—*Joseph T. Hogan, Chemical Engineer, Arabi, La.*

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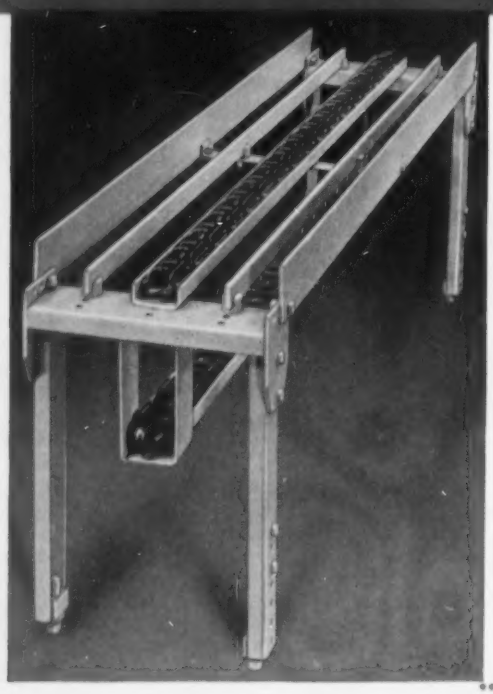
JUNE PRACTICAL IDEA WINNER was "Case-Conveyor Innovations," sent in by Paul Blakeslee, Maintenance Supervisor, Seabrook Farms Co., Bridgeton, N. J.

IT'S IN YOUR HANDS



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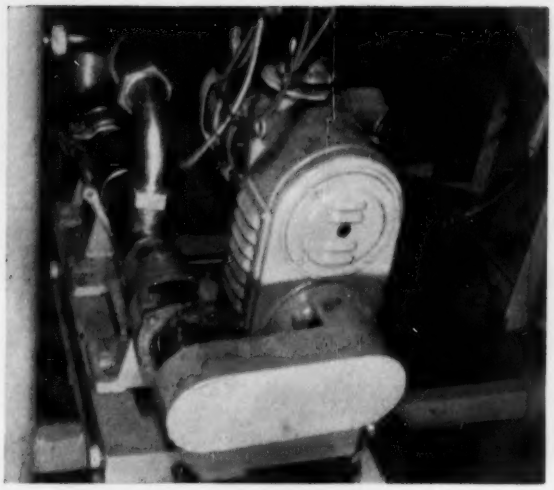


Curbs Vac Pan Air Leaks

Some products successfully processed by Gerber Products Co.'s Calefactor line (see article, FE June, p. 68) contain discrete particles and other elements that will not withstand the agitation resulting from action of some pump rotors in other lines.

Also, the Calefactor setup made necessary a product-pump seal at the discharge point of the vacuum pan, which has no barometric leg.

A Moyno pump (see photo) was selected because its gentle pumping action did not cause agitation-type product deterioration. However, the shaft packing gland seal on the inlet side of the pump was susceptible to wear and thus caused air to leak into the vac pan.

To eliminate this undesirable feature, the pump was reversed, so its discharge port became the inlet. And the stator was fixed to the vac pan pot by an "O" ring seal. This placed the stator and rotor in constant contact with product in the pot and eliminated both the air leakage and the possibility of vapor locking.

A special locking device was developed to prevent the packing gland nut from becoming loose due to reversal of rotation of the rotor. This has proved very satisfactory, even under extremely high vac.

This line is exceptionally compact, with the pump fitting snugly underneath the other machines. The pump, its motor, and variable speed drive were installed on a carriage that runs on inverted angle-iron rails. The carriage is held firmly in place, when in operation, by a jackscrew.

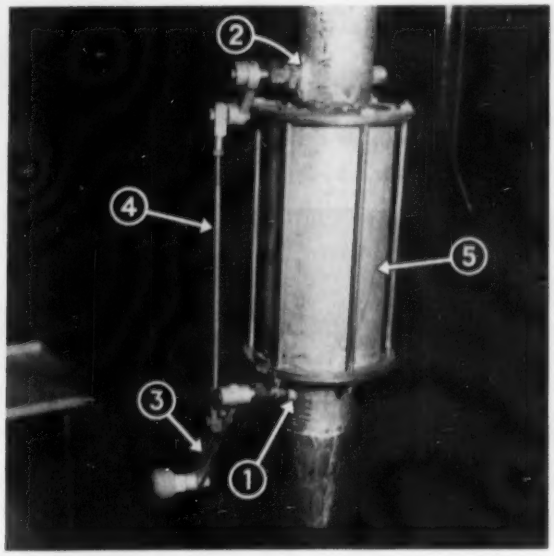
This now permits the cleaning crew to disassemble piping, detach the pump from the pot, and roll the carriage out from under other machinery for easy and efficient cleaning.—*Pump adapted by Roy Hawk, Process Development Section, Research Dept., carriage designed by Robert Lind, Engineering Dept., Gerber Products Co., Oakland, Calif.*

Aspirin vs. Leaks

A novel means of warning when water is leaking through foundations is reported in the wake of the recent floods.

Simple and inexpensive, it's based on the aspirin tablet —but not for the owner's headache.

Instead, it melts and thus gives passage to current between two electrical contacts, thus setting off an alarm. —*Technical Bulletin, General Foods Corp.*

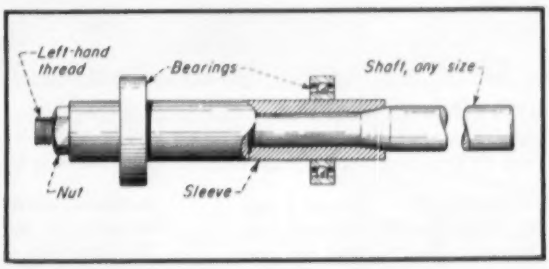


Home-Made Filler

Here is a simple volumetric unit for filling sliced strawberries, mixed with sugar, into 5 lb. cans.

Product flow to the filler is by gravity. When its discharge valve—(1) in photo—is closed, its intake valve (2) is open. And when the operator raises the lever (3) to open the discharge valve, the intake valve, which is connected by a toggle-joint (4) is automatically closed.

After emptying the cylinder (5), the operator closes the discharge valve and the operation is repeated.—*FE Staff.*



Roll-Changing Time Cut

In plants where rolls of packaging wraps, such as cellophane, Saran, etc., must be rewound or slit to various core sizes, it has been general practice to change shafts by entirely removing the bearings and housings.

To avoid this time-consuming task, we have installed in the bearings a hollow sleeve (see sketch) with a slight taper on the i.d. at one end. The various shafts to be used are tapered to fit the sleeve, and on their end have left-hand threads. Thus, when a left-handed nut is threaded onto the shaft end, the rotation of the shaft will tighten the nut and keep the whole assembly secure.

When a change of shafts is necessary, the nut is loosened, and the shaft tapped out lightly with a rubber or plastic mallet.

Much time can be saved by this method, especially if change-overs are frequent.—*E. V. Bates, Assistant Engineer, Kraft Foods Ltd., Mt. Royal, Quebec.*

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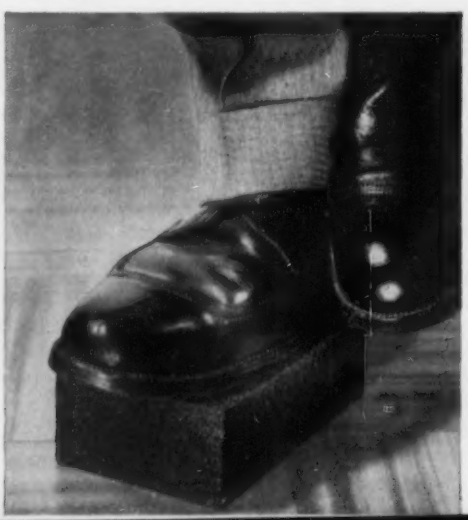
the cellular, stay-dry insulation

STAYS DRY—Cut a piece from your sample. Place it in water. Note how the hermetically-sealed glass cells filled with dead air keep it afloat. Weight it down for days, weeks or longer if you like. Remove the weight and it bobs back to the surface . . . proof that the sealed cells have absorbed no water, still have their original insulating efficiency.

VAPOR-PROOF — With a nail file, cut a ¼" thick slice from your sample. Hold it to your lips and try to blow smoke through it. The smoke won't penetrate . . . proof that FOAMGLAS is a positive vapor barrier in itself.

STRONG AND RIGID — Place your FOAMGLAS block on the floor. Stand on it. Note how it supports your weight without crushing. Compressive strength is over seven tons per square foot . . . making it ideal for load bearing applications.

WON'T BURN — Hold a flame to your sample. You'll see at once that it does not burn . . . an important safety feature in all construction. It's even acid-proof and rodent-proof as you can prove if you happen to have a vial of acid or a pet rat handy.



Send for a sample and make these simple tests!

Prove to yourself that FOAMGLAS is your ideal insulation!

Let us send you a free sample of FOAMGLAS. Use it to make the few simple tests illustrated. You'll prove that this unique cellular glass insulation has exactly the right combination of properties to assure you of these vital benefits: constant insulating efficiency . . . long, maintenance-free life . . . strength and rigidity for a variety of structural applications . . . ease of handling and installation.

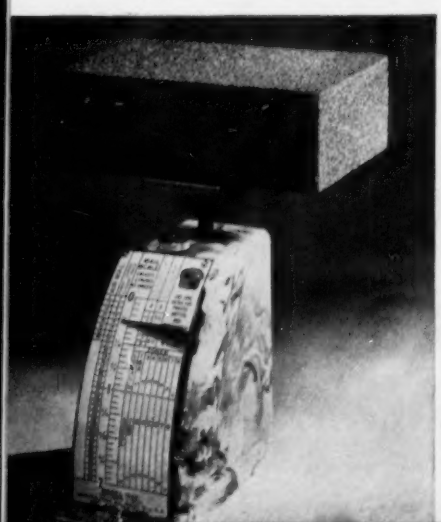
Thousands of actual users have proved in actual performance the benefits so clearly demonstrated by these tests. No wonder, then, that new users every day are picking FOAMGLAS to insulate the roofs, ceilings, walls and floors of all types of buildings, low temperature spaces, piping and equipment. Send for a sample today and make your own tests. Use the handy coupon, or write . . .

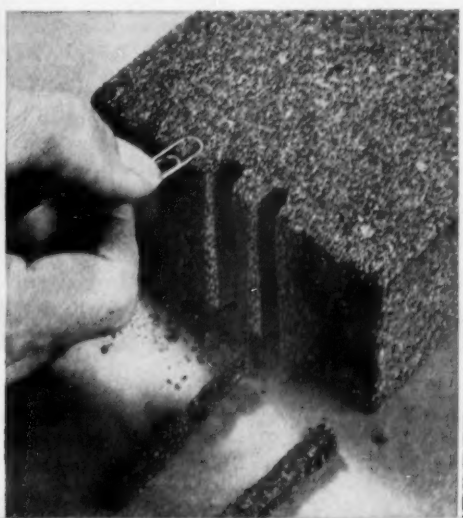
Pittsburgh Corning Corporation

Department O-86, One Gateway Center
Pittsburgh 22, Pa.
In Canada: 57 Bloor Street West, Toronto; Ontario

LIGHT WEIGHT — Just pick up your sample to see how light and easy to handle it is. Check actual weight on your company's postal scale if you wish. The density of FOAMGLAS is only 9 pounds per cubic foot.

EASY TO SHAPE AND CUT—Shave some strips off your sample with an ordinary paper clip . . . workmen use knives, saws or trowels for quick shaping and fitting on the job.





Pittsburgh Corning Corporation
Department O-86, One Gateway Center
Pittsburgh 22, Pennsylvania
In Canada: 57 Bloor St. W., Toronto, Ontario

Please send me a sample of FOAMGLAS for testing.

Name_____

Company_____ Title_____

Address_____

City_____ Zone____ State_____

. . . doing a sweet job for Maui pineapples

At the Maui Pineapple Company sugar ionization plant in Hawaii, they had a big problem in piping to lick before they upped their output to 60 or more gallons of purified syrup per hour.

First, they needed piping that would not be attacked by chemicals. Next, the piping must not contaminate, discolor or impart any kind of a taste to the pineapple juice.

Uscolite plastic pipe, fittings and valves were installed throughout the plant, and proved to be exactly what Maui Pineapple Co. wanted. Uscolite resists chemicals, has no effect on food or food processing materials. And in the warm humid climate of Hawaii, cold Uscolite pipe lines have far less tendency to sweat than metal pipe.

Uscolite has been adopted by over 500 leading chemical processors. For replacement or completely new piping, contact any of the 28 "U. S." District Sales offices or write us at Rockefeller Center, New York 20, N. Y. You are assured of immediate delivery of standard sizes and threaded fittings, including Uscolite (Hills-McCanna) valves.

US RUBBER

Mechanical Goods Division

United States Rubber

● At the check-out counter of a supermarket, a member of a research team asked a lady if she'd mind answering one question. She didn't mind.

"Why do you buy X brand of flour?"

"Well, white flour all seems pretty much the same today, but *this* brand clearly assures you that vitamins have been added. See, it tells you plainly on the package 'ENRICHED FLOUR' and lists the vitamins. We buy enriched bread and other foods with vitamins—so I say why not get that health advantage in the flour I use?"

The lady is absolutely right, and millions agree with her. That's why "ENRICHED" is a selling word.

But why "*Pfizer* enriched"?

For good reasons. To begin with, Pfizer has been a vitamin research and production center since the first vitamin was commercially produced. Bi-Cap® was one of the first enrichment concentrates. And this "head start" in vitamins has continued. What this means is that Pfizer can help you with the newest developments in enrichment products.

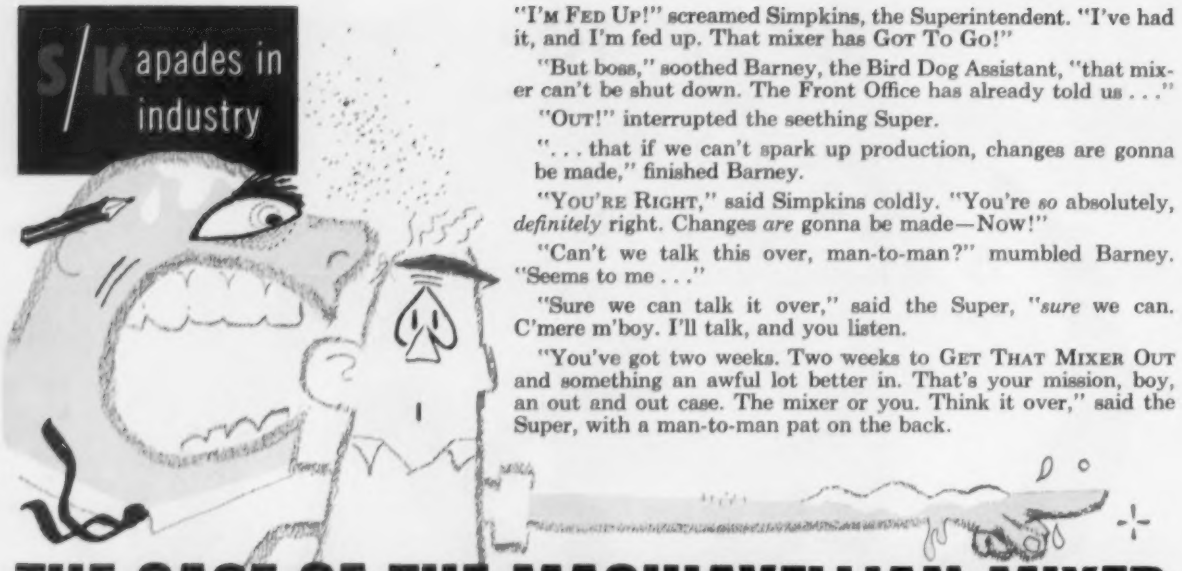
RIGHT NOW IMPROVED PFIZER BI-CAP is made with a new type of Riboflavin which gives it a *lighter color and overcomes unsightly agglomeration.* All three forms of BI-CAP are also made with Thiamine Mononitrate for better Vitamin B_1 stability.

Continued Pfizer research in riboflavin, thiamine and other health ingredients will help you offer your customers improved flour for tomorrow's improved bread and baked goods. Look to Pfizer for the finest enrichment concentrates.

Pioneer and Leading Manufacturer of Vitamins Pfizer

CHAS. PFIZER & CO., INC.
Chemical Sales Division
630 Flushing Ave., Brooklyn 6, N. Y.
Branch Offices: Chicago, Ill.; San Francisco, Calif.; Vernon, Calif.; Atlanta, Ga.; Dallas, Texas

SK apades in industry



"I'm Fed Up!" screamed Simpkins, the Superintendent. "I've had it, and I'm fed up. That mixer has Got To Go!"

"But boss," soothed Barney, the Bird Dog Assistant, "that mixer can't be shut down. The Front Office has already told us . . ."

"Out!" interrupted the seething Super.

". . . that if we can't spark up production, changes are gonna be made," finished Barney.

"You're Right," said Simpkins coldly. "You're *so* absolutely, *definitely* right. Changes *are* gonna be made—Now!"

"Can't we talk this over, man-to-man?" mumbled Barney. "Seems to me . . ."

"Sure we can talk it over," said the Super, "*sure* we can. C'mere m'boy. I'll talk, and you listen.

"You've got two weeks. Two weeks to Get That Mixer Out and something an awful lot better in. That's your mission, boy, an out and out case. The mixer or you. Think it over," said the Super, with a man-to-man pat on the back.

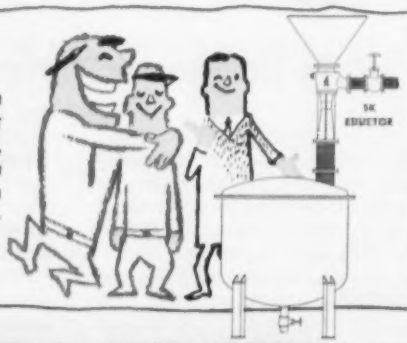
THE CASE OF THE MACHIAVELLIAN MIXER AND THE SATIATED SUPERINTENDENT

"...need your help," phoned Barney to his nearest SK Sales Engineer. "I've thought over this problem I've told you about, read SK's Bulletin J-1, and I think a jet of some kind is right for the job."

"YOU'RE RIGHT," replied SK's nearest Sales Engineer. "You're so absolutely, definitely right. An SK Water Jet Eductor will do the job, and I'll be right over to tell you how."

NO BIRD DOG NOW

Now, thorough mixing of dry powder and a liquid prior to discharge into a tank is accomplished by the use of an SK Fig. 235 Eductor as shown. Pressure liquid enters the eductor, entrains the powder, mixes the two in the venturi of the eductor and discharges the mixture into a receptacle. The streamline design provides maximum efficiency. No bird dog now, Barney is consulted on every production problem—bowls with Simpkins every Thursday night.



MORAL:

Get acquainted with all types of SK Jet Apparatus. Send for a copy of Condensed Bulletin J-1. Make use of a qualified specialist, your nearest SK Sales Engineer.

Schutte and Koerting
COMPANY
MANUFACTURING ENGINEERS

2223 STATE ROAD, CORNWELLS HEIGHTS, BUCKS COUNTY, PA.

JET APPARATUS: Ask for Condensed Bulletin J-1.
ROTAMETERS & FLOW INDICATORS: Ask for Condensed Bulletin 18-RA.
VALVES: Ask for Condensed Bulletin V-1.
HEAT TRANSFER APPARATUS: Ask for Condensed Bulletin HT-1.
GEAR PUMPS: Ask for Bulletin 17-A.

B.F.Goodrich

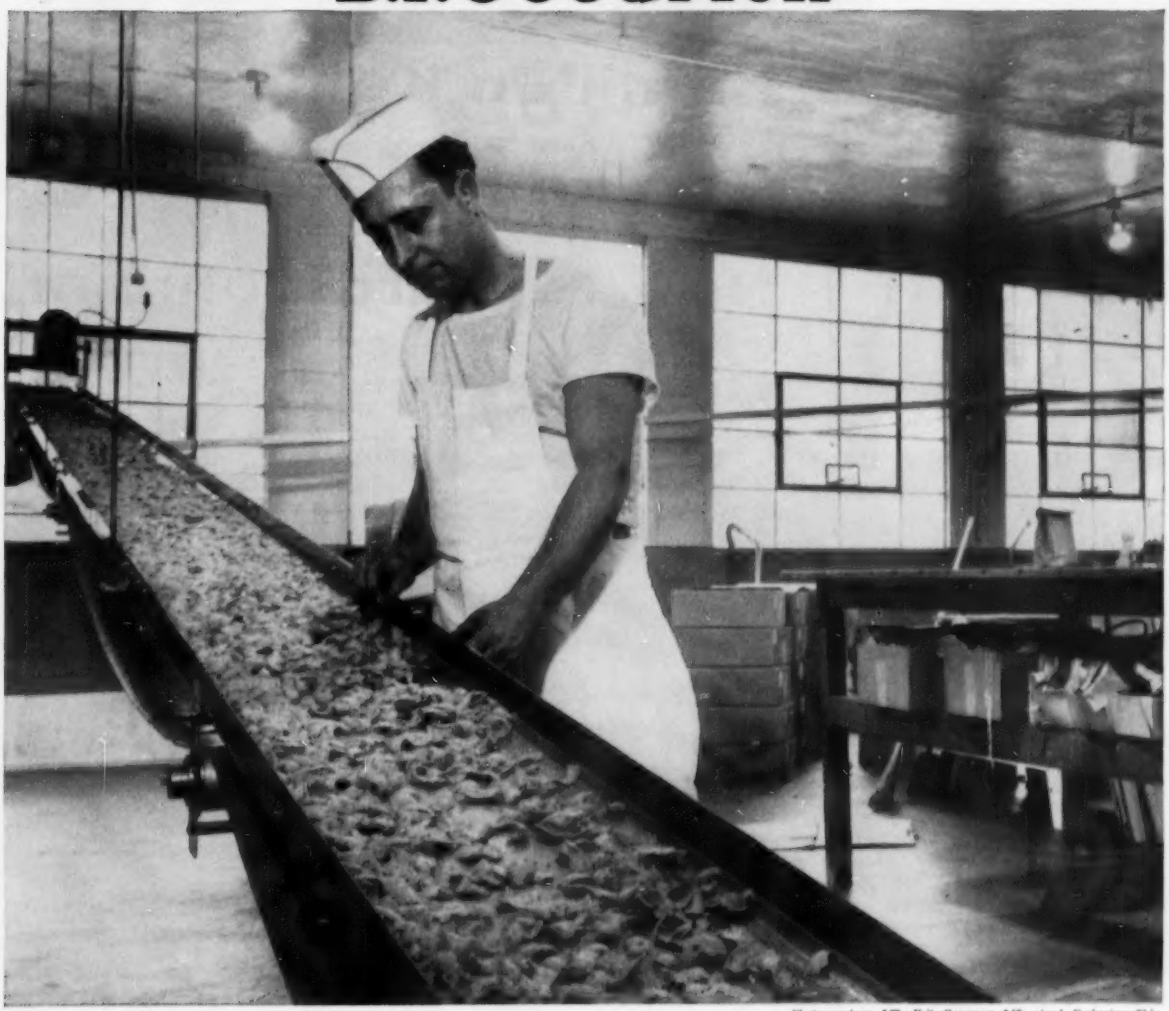


Photo courtesy of The Frito Company of Cleveland, Barberton, Ohio

Easy-to-clean Koroseal belt stands grease, salt—never gets rancid

IN this plant, the combination of salt and cooking oil on the hot chips used to mean short conveyor belt life. The cotton belt they were using was hard to clean, had to be boiled in caustic soda every week. What's more, it stretched, had to be refastened all too often.

Then the Koroseal belt in the picture was tried, and it solved all these problems at once. Because it's made of Koroseal flexible material, this B. F. Goodrich belt stands cooking oils, abrasive salt, animal fats, most acids as well as hard use, and just about everything else that ruins most materials.

Food particles can't grind into Koroseal's smooth, polished surface. That's why it is so easy to clean. A damp squeegee cleans the belt in the picture each time it passes by. Other users say that just a quick wipe with a damp cloth and detergent, and the Koroseal belt is as clean and new looking as ever.

Since Koroseal is completely waterproof, the belt never gets damp or soggy, and so can be used right after washing. Koroseal resists cracking and peeling, never gets soft or sticky. And, of course, there's no danger of contamination with Koroseal—it has no odor, no taste, never gets rancid.

Get in touch with a B. F. Goodrich distributor and let him tell you more about the line of belts developed by B. F. Goodrich for the food industry. *B. F. Goodrich Industrial Products Co., Dept. M-719, Akron 18, Ohio.*

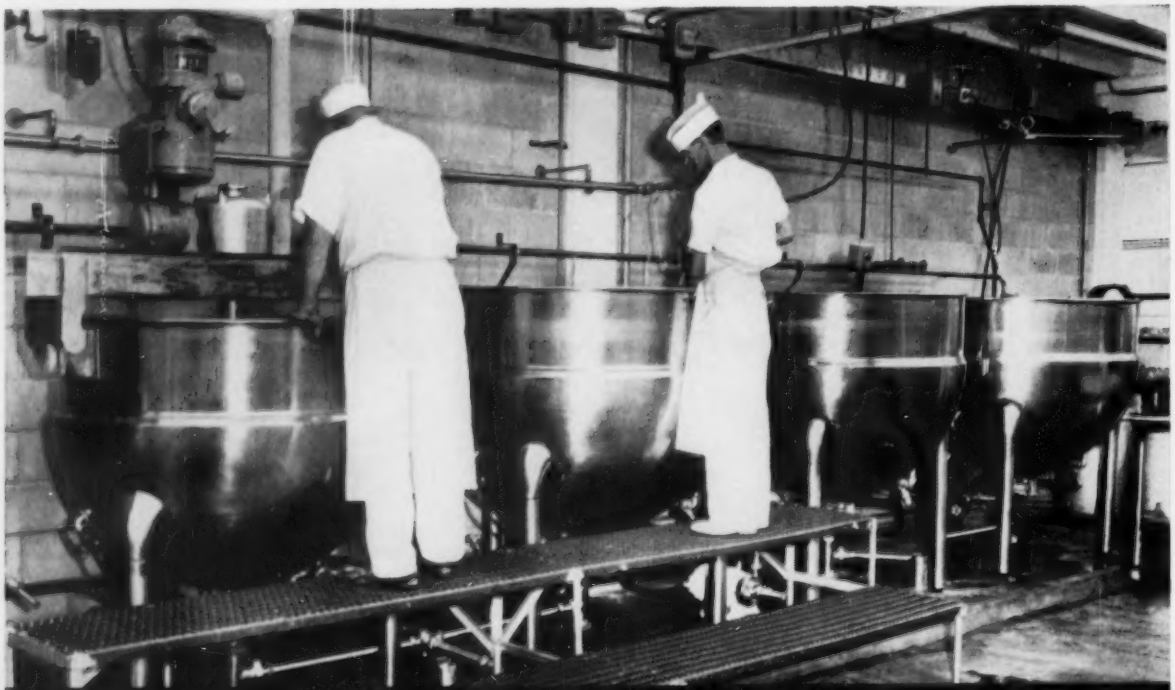
Koroseal—T. M. Reg. U. S. Pat. Off.

B.F.Goodrich

INDUSTRIAL PRODUCTS

When You Need a Kettle Quick!

Hamilton Kettles Choice for New Howard Johnson Commissary . . .



Fred W. Scott, manager, reports, "We've tried all types . . . and we believe that Hamilton kettles are the finest, most efficient on the market." Recently installed kettles: one 200 gallon style CG Mix Cooker, three 300 gallon style SA kettles.

The new Howard Johnson Food Commissary, Miami, Florida, selected Hamilton Kettles for fast cooking, sanitary design and stainless steel construction.

Chef O. E. Rathfeldt likes the way Hamilton's extra large kettle diameter gives fast cooking, increases production. He also says streamlined, sanitary design makes equipment easy to clean, saves valuable down time, and the stainless steel construction protects against corrosion, guarantees unusually long kettle life.

More and more food commissaries, meat packers, canners and other members of the food processing industry are turning to Hamilton for fine kettles and prompt service. For information on the complete line of Hamilton Kettles, call Paul Hock, GRandview 1-4110 or write.

HAMILTON COPPER & BRASS WORKS

Division of the Brighton Corporation **824 State Avenue** **Cincinnati 4, Ohio**

1906

In 1906 . . . the year marking introduction of the first Brunner-engineered product . . . artificial freezing still depended more on manpower than engineered horsepower.

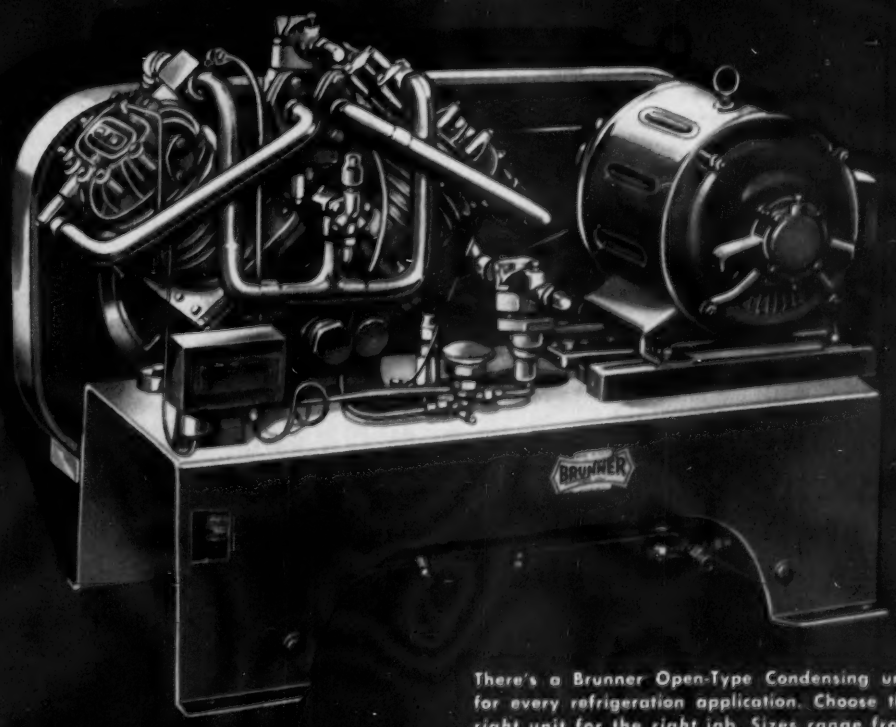
PROVEN QUALITY
50th Anniversary
BRUNNER
SINCE 1906
DEPENDABLE

TODAY—

Brunner engineering makes food processing easier...more accurate...more profitable

Go Brunner—for the most complete line of commercial and low-temperature Refrigeration Condensing units.

BRUNNER MANUFACTURING COMPANY, UTICA, N.Y.
THE BRUNNER CO., GAINESVILLE, GA.
IN CANADA: BRUNNER CORP. (CANADA) LTD., TORONTO, ONTARIO



There's a Brunner Open-Type Condensing unit for every refrigeration application. Choose the *right* unit for the *right* job. Sizes range from ¼ H.P. through 100 H.P.

Doesn't Your Business Deserve the BEST SANITIZING AGENT?

insist on

GENUINE

Roccal

Reg. U. S. Pat. Off. and Canada

BRAND

SANITIZING AGENT

to do a more effective job throughout your plant!

The ORIGINAL Quaternary Ammonium Germicide

In the Food Industry, the importance of using only the best sanitizing methods cannot be over-emphasized.

In Roccal, the original quaternary ammonium germicide, the food industry is offered a sanitizing agent that is laboratory tested and controlled. The uniform quality of Roccal means uniformly good results in doing a proper sanitizing job.

Roccal is a powerful germicide. In recommended dilutions it is non-poisonous, non-irritating to the skin, virtually odorless and tasteless.

Roccal can be used for every sanitizing job in processing and packaging in the following food industries: milk, cream, ice cream, butter, cheese, egg breaking, sugar, fish, poultry, fresh frozen vegetables and fruits, meat products, cereal products, candy and beverage, wherever the product comes in contact with equipment. Also keeps walls and floors sanitary.

START USING ROCCAL TODAY—
you'll find that better sanitation is good business

Samples and Literature on Request

Sterwin Chemicals inc. 1450 Broadway, New York 18, N. Y.
Subsidiary of Sterling Drug Inc.

See Your Local Supply Dealer

USES IN FOOD INDUSTRIES

To Sanitize:

- STORAGE BINS
- FREEZING UNITS
- REFRIGERATORS
- CONVEYORS
- TANKS
- PROCESSING EQUIPMENT
- PACKAGING EQUIPMENT
- AIR CONDITIONING AND COOLING SYSTEMS
- WALLS AND FLOORS
- WASH ROOMS
- TRUCKS
- AND AS A HAND RINSE FOR PERSONNEL

Our Technical Service Department stands ready at all times to answer your questions about specific uses for ROCCAL

FLAVOR *as flavor should be*

Ingredients in sauces and mustards, while a delight to lovers of steaks and hot dogs, can be the despair of the plant manager who puts them together.

Theirs is a temperamental balance, easily disturbed by traces of too much of one, or not enough of another, or, even by tiny amounts of corrosion.

Some pipelines, particularly, make excellent places for materials to hide from batch to batch. Often, too, some pipelines alter taste through metallic pickup and through the effects of corrosion.

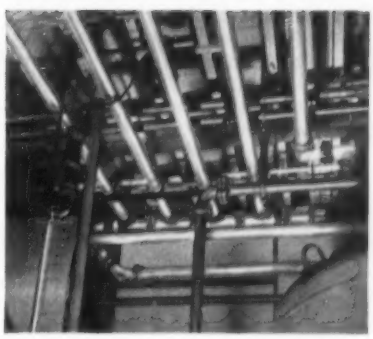
But R. T. French Company, for all the mustard and sauces they produce, no longer has a quality standards pipeline corrosion problem. The company uses pipe made of PYREX brand glass No. 7740.

Neither food acids nor brines nor anything else R. T. French—or you—would use in processing foods will have any damaging effect on glass pipe.

Besides, PYREX pipe is easy to clean. You simply clean it *in place* (as R. T. French does). If you handle sticky, clinging, pulpy foods, you'll like this feature. You'll also like being able to *see* when it's clean, just as you can see when it needs cleaning.

These vitally important features would be worth the price even if PYREX pipe were expensive. It's not. You pay about the same for glass pipe as for other corrosion resistant pipe. And your PYREX lines will resist corrosion for *centuries*.

Your PYREX pipe distributor will be glad to tell you more. Call him in or write us for his name.



This R. T. French PYREX pipe manifold system from mill manufacturing to glass-lined storage tanks will *never* corrode.

CORNING GLASS WORKS, CORNING, N. Y.
58 CRYSTAL STREET
Corning means research in Glass

How to increase the throughput of a filter

Filter aids are used primarily in systems in which the filterable solids tend to form an impermeable layer of slimes on the filter cloth, thus choking off the flow. Tests have shown the resistance of a cake of filterable sugar solids may be as much as 10,000 times that of a good filter aid filter cake. Filteraids perform the useful function of reducing the resistance, thus increasing the rate of flow through a filter.

There are a number of ways in which throughput can be increased. In general, the coarsest (most permeable) filteraid should be used that will provide a satisfactory degree of clarification. Filtration tests under controlled conditions in the laboratory will determine within a few hours the correct grade of filteraid for any given system.

Second, the filteraid should be used at its optimum concentration. Adding filteraid in increasing increments in any given system, produces very substantial increases in flow up to a certain point. Above this optimum percentage, further increases in flow are much reduced. In fact, in many systems the addition of too much filteraid will result in a definite decrease in throughput.

A third important factor in flowrate is the use of the maximum pressure consistent with the nature of the solids being filtered. Diatomite filteraids usually produce a relatively incompressible cake, so that increases in pressure result in increased flow. However, in a comparatively few systems, usually involving high solids of gelatinous nature, the addition of sufficient filteraid to render the cake incompressible is uneconomic. In these cases the pressure which affords the best balance between economical use of filteraid and the desired throughput should be determined by test.

A fourth method of increasing throughput is ordinarily recommended only under emergency conditions – that is, to "short-cycle" the press. Because the filtration rate of any filtration drops off rapidly as the cake thickness increases, it follows that a higher average filtration rate may be obtained by arbitrarily shutting off the press while the cake is still relatively thin, discharging the cake and starting a new cycle. Short-cycling may actually double the output of any given filter station – BUT – can be accomplished only with increased labor costs. However, it is sometimes useful when changes in process or unusual production requirements demand higher throughput on a temporary basis until additional filtration capacity can be installed.

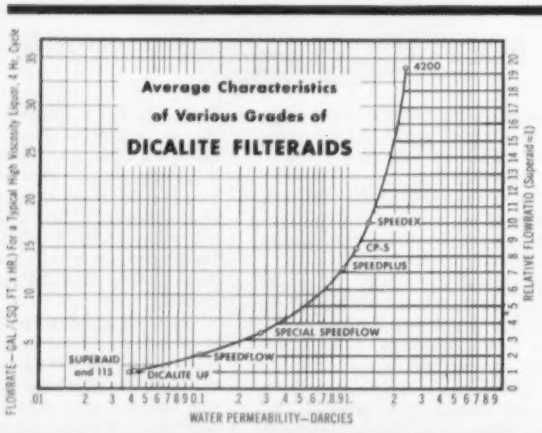
Because of the influence on filtration rate of a number of process variables that cannot be covered in this brief outline, it is suggested that you insist on good technical service from your filteraid supplier. The services of our experienced filteraid engineers will enable you to secure maximum performance from your filteraid and maximum value for your filteraid dollar.

Paul W. Leppla, *Technical Director*

. . . is easy with

DICALITE FILTERAIDS!

. . . it's easy because the various grades of Dicalite filteraids afford such a wide range of filter throughput. When the output of your filter station matches production demands, you have no worries. But when sudden peak demands call for a sharp increase in filter output, you can use one of the four ways discussed in the column at the left – keeping in mind the flowrate range of the various Dicalite grades shown on the chart below. Again, should your process liquor vary in filterability from one day to another (as happens in many industries), you can maintain both quality and production either by varying the amounts of Dicalite fed to the filter, or by the use of another grade of Dicalite. One way or the other, you'll always have the right combination when you filter with Dicalite.



Dependable GLC GREAT LAKES Dicalite® DIATOMACEOUS MATERIALS

DICALITE DIVISION • GREAT LAKES CARBON CORPORATION
612 SOUTH FLOWER ST., LOS ANGELES 17, CALIFORNIA

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DOUBLE SERVICE with BARRETT® BRAND Cylinder Anhydrous Ammonia

A PHONE CALL to your distributor (listed below) will bring *fast* delivery of Barrett Standard Anhydrous Ammonia in cylinders.

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West Hartford: The Christian Petersen & Son Co. P.O. Box 247 26 Brook Street. Tel. ADams 3-1244

FLORIDA
Jacksonville: D. W. Anderson P. O. Box 1346 (Mailing Address) 615 East Bay Street Tel. EL 4-2428, Nights, Sun. & Holidays EL 3-1161
Miami: Columbia Chemical & Supply Co. P. O. Box 967, 7430 N. E. Fourth Court. Tel. PL 8-2544-5. Nights, Sun. & Holidays PL 9-2883
Tampa: Food Equipment & Supply Co. P.O. Box 422, 1809 Second Ave.

GEORGIA
Macon: The Anderson Chemical Co., Inc. P. O. Box 1424 1620 Waterville Road. Tel. 2-7962

ILLINOIS
Chicago: Westland Engineering Supply Co. 53 West Jackson Blvd. Tel. Harrison 7-0760

IOWA
Burlington: McKesson & Robbins, Inc. West Central District Office. 100 North 4th Street. P. O. Box 591 Tel. Plaza 4-4603
Cedar Rapids: McKesson & Robbins, Inc. Cedar Rapids Division. 900 Second Street, S. E. Tel. 4191
Ottumwa: J. W. Edgerly & Company. 120 West Main Street. Tel. 74
Sioux City: McKesson & Robbins, Inc. Sioux City Division. 308 Pearl Street. Tel. 5-7931

KANSAS
Wichita: Reid Supply Co., 306 West Second Street. Tel. Amherst 7-1232

KENTUCKY
Henderson: P. B. & S. Chemical Co. 1100 North Adams Street
Louisville: Griffin Chemical Co. 528 Franklin Street

LOUISIANA
New Orleans: Sam Reisfeld & Co. 403 Queen & Crescent Building Tel. Canal 8801-02-03

MAINE
Portland: Acme Engineering Co. 46 Market Street Tel. 5-0011

MARYLAND
Baltimore: Leidy Chemicals Corp. 920 South Eutaw Street Tel. Mulberry 5-2200

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Springfield: The Chemical Corp. 54 Waltham Avenue Tel. Republic 9-5601
West Springfield: Barker Chemical Co. P.O. Box 173, 101 Circuit Ave. Tel. RE 3-1007
Worcester: Brewer & Company, Inc. Industrial Chemical Division 45 Arctic Street

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Detroit: Eaton Chemical & Dyestuff Co. 1490 Franklin Street Tel. Woodward 2-5216

MINNESOTA
St. Paul: Lyon Chemicals, Inc. 2305 Hampden Avenue Tel. Midway 6-1351

MISSOURI
Kansas City: Abner Hood Chemical Co. 507-517 North Montgall Avenue Tel. Chestnut 3621-3622
St. Louis: McKesson & Robbins, Inc. Chemical Division. 904 Landreth Building. 320 North 4th Street Tel. Maine 2083
St. Louis: G. S. Robins & Co. 126 Chouteau Avenue Tel. Main 1-5155

NEBRASKA
Omaha: McKesson & Robbins, Inc. Omaha Division. 902 Farnam Street Tel. Atlantic 5000

NEW JERSEY
Paterson: Lotte Chemical Corp. 109—5th Avenue. P. O. Box 2488 Tel. Mulberry 4-0704 if no answer Saddle River 1-2224
Paterson: Seaboard Industries 195 Keen Street
Paterson: Wollen Chemical & Supply Co. Wall Street & Sixth Avenue P. O. Box 1659. Tel. Armory 4-2800

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Albany: Albany Laboratories, Inc. 67 Howard Street Tel. Albany 4-6388 — 4-1747
Brooklyn: Tex-lte Products Corp. 885 Flatbush Avenue Tel. BU 2-8112
Buffalo: Commercial Chemicals, Inc. 211 Hertel Avenue. Tel. Delaware 5314
New York: N. H. Heyman, Inc. 168 East 91st Street Tel. ATwater 9-0259
New York: E. M. Sergeant Pulp & Chemical Co. 7 Dey Street Tel. WOrth 2-4340
Poughkeepsie: Duso Chemical Co., Inc. P. O. Box 665, Fulton & Fairview Streets. Tel: 5318
Rochester: Wm. B. Duffy Carting Co. 62 Seio Street Tel. Hamilton 9640
Syracuse: Gleason Materials & Equipment Co., Inc. 424 Hefferman Bldg. 205 Harrison Street

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OHIO
Cleveland: The Harshaw Chemical Co. 1945 East 97th Street Tel. Cedar 6300
Cincinnati: The Harshaw Chemical Co. 6265 Wiehe Road
Cincinnati: Wirthlin-Mann Co. P. O. Box 56, 1930 Dana Avenue Tel. Redwood 1-6890

OKLAHOMA
Oklahoma City: Rex Engineering & Sales Co. 2735 N.W. 10th Street P. O. Box 5141
Tulsa: Vaughn Chemical Co. 1102 East 3rd Street Tel. Cherry 2-8211

PENNSYLVANIA
Altoona: Western Pennsylvania Chemical Co., Inc. P. O. Box 703 4125-41 Sixth Avenue Tel. 9438, 9439, 2-2698
Pittsburgh: Thomas Knoch 244 Bascom Street Tel. Wellington 1-0777

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TENNESSEE
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TEXAS
Dallas: Chas. H. Platter & Co. Texas Bank Building Tel. Central 8794
El Paso: George S. Thomson Co., Inc. 611-615 North Campbell Street Tel. 3-4471
Houston: Goldsmith-Sanders 756 M & M Building. Tel. Capitol 7-9171
San Antonio: Interstate Brokerage Co. P. O. Box 4497, Station "A" 411 North Medina Street

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Salt Lake City: Mine & Smelter Supply Co. 121 West 2nd Street, South P. O. Box 1348. Tel. 3-2791

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WEST VIRGINIA
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Milwaukee: Banlo Chemicals 1907-25 South 89th Street Tel. Spring 4-6000

PROMPT DELIVERY of a reliable product is always desirable. And when delivery and reliability are backed up by both your local dealer and a nationwide service force, your service is *doubly good.*

THIS IS WHAT you get when you order Barrett Brand Anhydrous Ammonia. Not only do you get a product made by America's largest producer of high-purity, extra-dry Ammonia, but you get service from a local distributor.

YOUR LOCAL DISTRIBUTOR is an independent firm whose livelihood depends on his personal service to you, backed by the staff, experience and facilities of Nitrogen Division. He can help you solve any technical problems you may have. He will also provide you with the type of service you want. Call him today!

Allied Chemical — NITROGEN DIVISION

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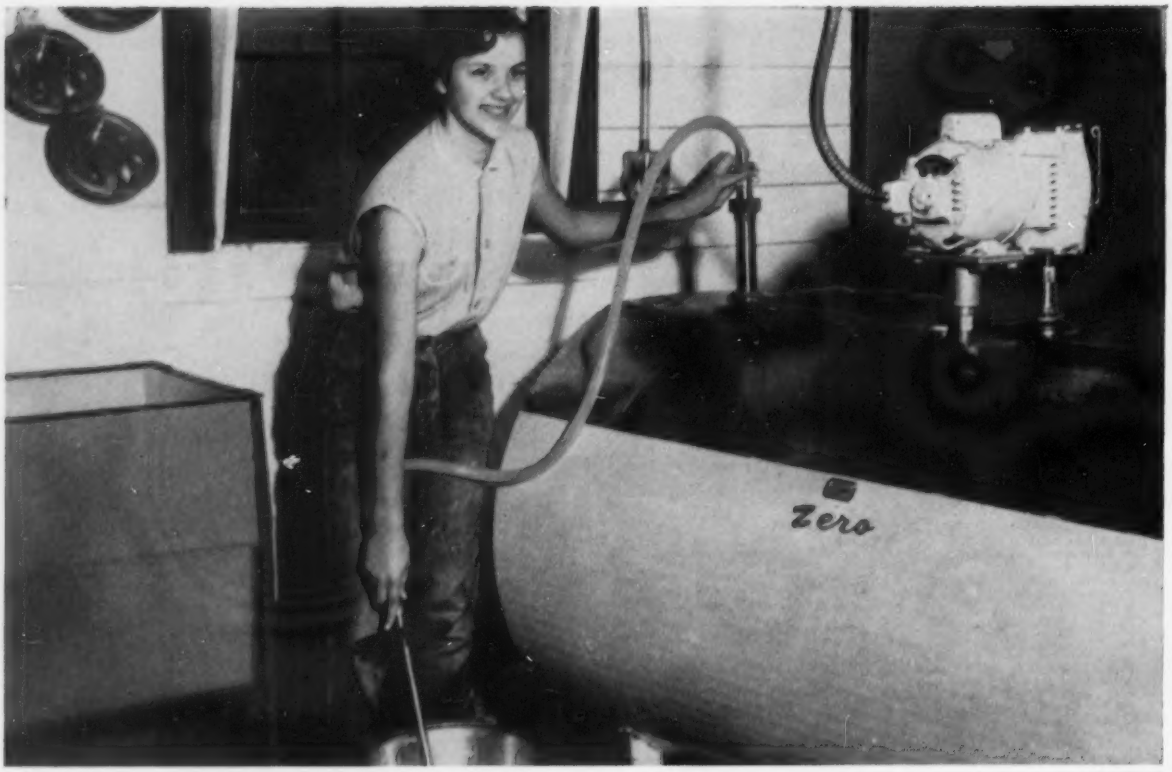


To guard against oil contamination on a shaft-down agitator application

NEW MILK COOLERS DEPEND ON Century Performance-Rated® GEARMOTORS

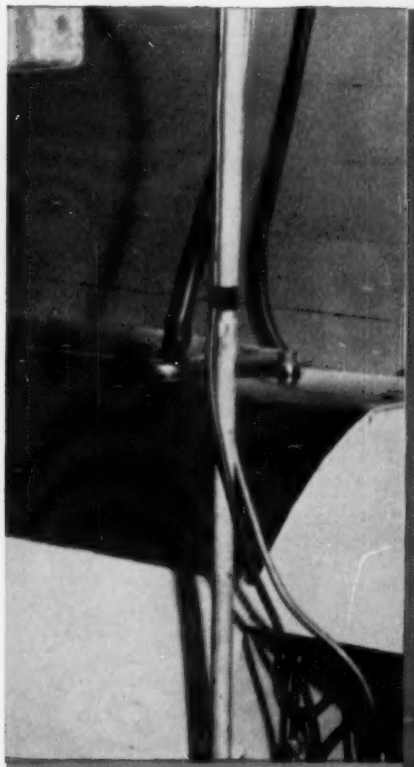
Century Performance-Rated Gearmotors are playing an important part in making possible this new era in milk handling. Slow agitation is important to chill the milk quickly and evenly in the cooler. Ordinary agitator motors mounted shaft-down, dripped oil into the milk. Century's unusually reliable standard shaft seal has virtually eliminated this problem.

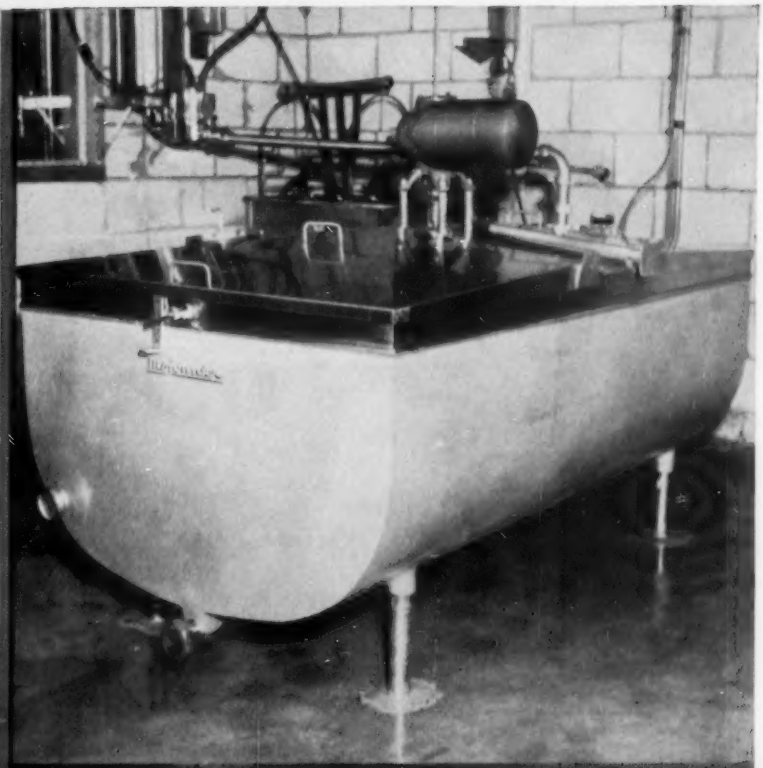
Furthermore, a motor must be "washable" if it is to be used in the sanitary milkhouse. Century can supply a pedestal-mounted gearmotor with a specially designed smooth-contour cover. This cover eliminates most crevices in which dirt could collect, and it protects the motor from moisture . . . even when it's washed down.

Could your processing operation be improved by Century Motors, Performance-Rated to give you the correct speed, protection and freedom from contamination? We will be happy to discuss your problems with you.

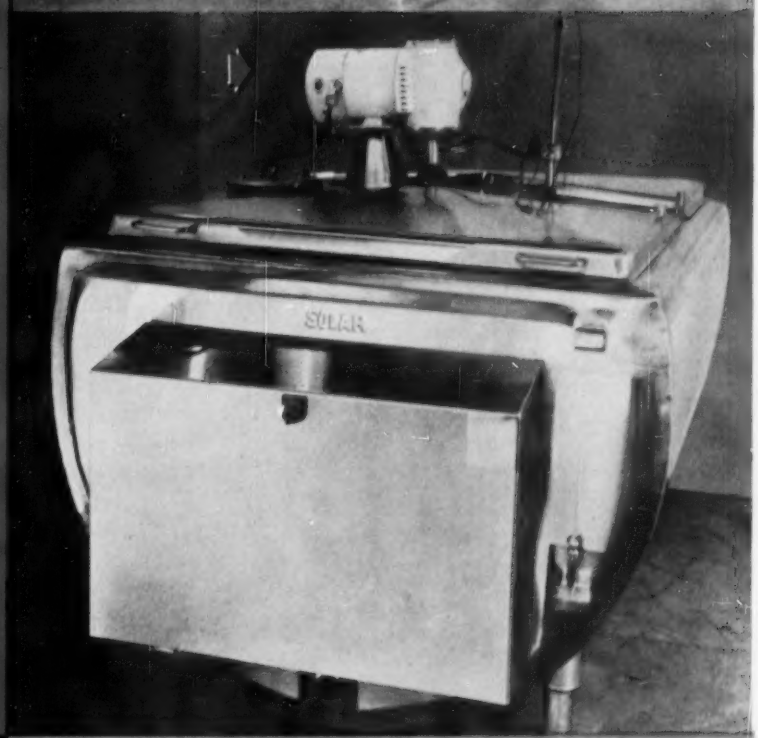
For full data call your nearest Century Sales Office or Authorized Distributor.

46





NEW PROFIT AND EFFICIENCY in milk handling is made possible for even small and medium-sized dairymen using these ingenious new bulk milk coolers. By drawing the fresh milk directly into the cooling tank for storage, bacteria counts are kept at a minimum, butterfat content is preserved. Leading manufacturers of these popular new milk coolers equip them with Century Gearmotors.



Performance Rated© MOTORS
1/20 to 400 H.P.

CENTURY ELECTRIC COMPANY

1806 Pine Street • St. Louis 3, Missouri • *Offices and Stock Points in Principal Cities*

You're sure to be in

GOOD TASTE

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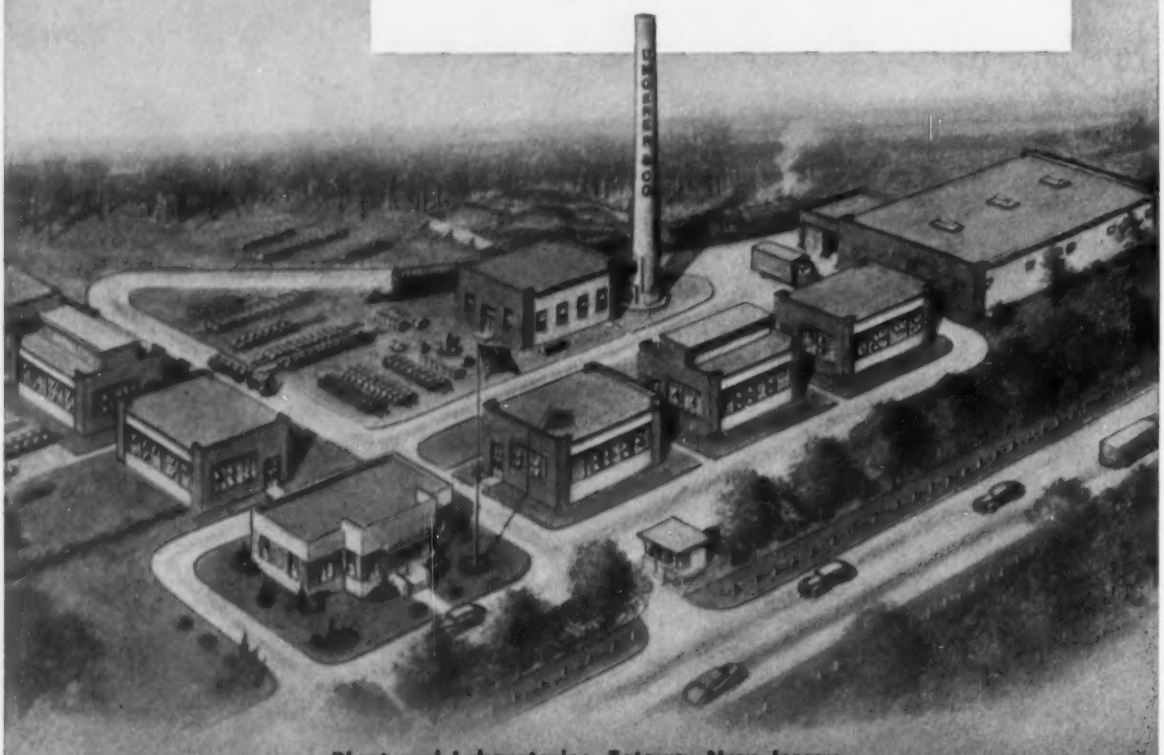
UNGERER

OIL LEMON IMITATION FLAVOR NO. 2986

Another top quality product of the Ungerer laboratories. Samples and technical information on the use of this flavor in your product will be supplied on request.



Plant and Laboratories, Totowa, New Jersey

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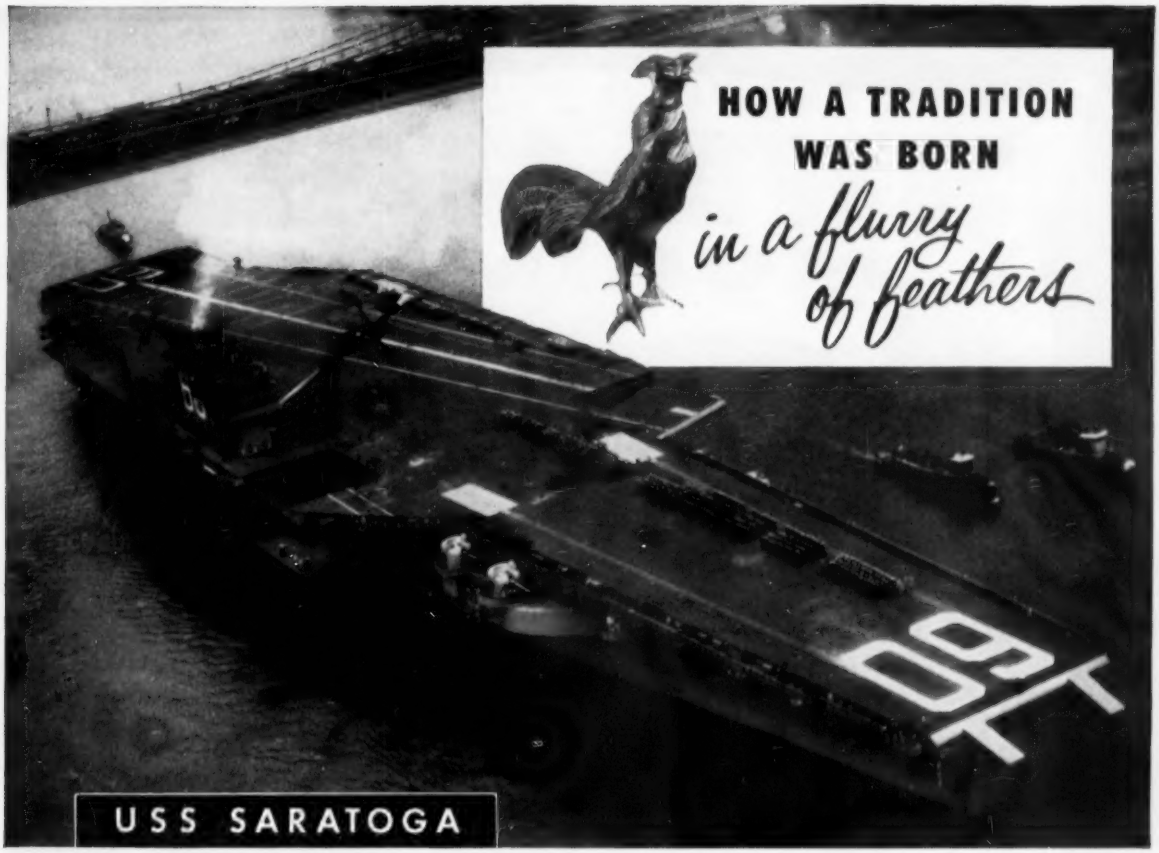

The symbol, and the spirit, of the fighting gamecock lives on with the commissioning of the powerful aircraft carrier, *USS Saratoga.*

The incident which gave birth to this 142 year old Navy tradition took place on the decks of the first *Saratoga* as she closed for action against four men-o'-war in 1812. In the opening minutes of the engagement an enemy ball landed on deck—crashing into a coop containing a gamecock brought aboard by a sailor.

With a flurry of feathers, the startled bird flew to the rail and, as if expressing his personal indignation, crowed lustily and defiantly. Taking this as an omen of good luck, the outnumbered and outgunned American ship entered the battle with new courage and completely won the day.

The Navy's newest aircraft carrier is the fourth ship to bear the name *Saratoga* and adopt its fighting symbol. As aboard its sister aircraft carriers, the USS Forrestal, USS Independence*, and USS Ranger*, Walworth Valves and Fittings are installed. We are proud of the many contributions that our products and engineering skills have made to these outstanding vessels.

Walworth products installed aboard these ships include Pressure-Seal Cast Steel Gate, Globe, and Angle Valves, Fabricated Cast Steel Manifold Valves, Cast Steel Y-Globe and Angle Valves, Bronze Gate, Globe, Angle, and Check Valves and thousands of Walworth pipe fittings including Walseal® Fittings, Flanges, and Unions.

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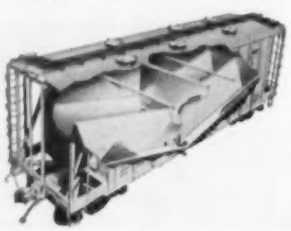
Starch, sugar, plastics, chemicals—these are a few of the many products successfully shipped in General American's Airslide Car.

1000 CWT of **FLOUR** in one package

Save! Ship flour in bulk via Airslide® cars

The nation's millers and bakers were first to recognize the value of Airslide cars. Today, these industries are among the principal users of this *safe, clean, economical* method of bulk transportation. Over 2000 Airslide cars are now in use or on order. They require no re-spotting, provide far more clearance for unloading and can be unloaded into any conveying system as fast as the system permits. If such requirements are important to you, write today for full information about General American's new Airslide car.

CLEAN INTERIOR DESIGN. *All-welded construction provides maximum sanitation and minimum product retention. All hatches and outlets provide a hermetic seal, assuring complete in-transit protection.*



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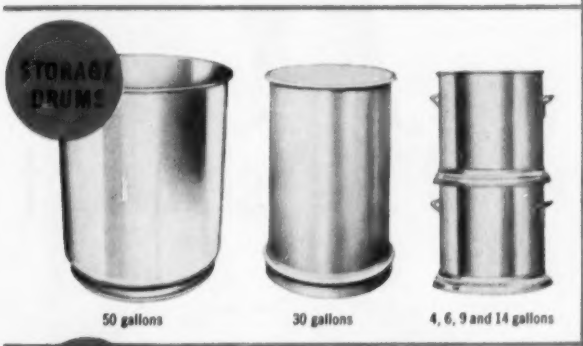
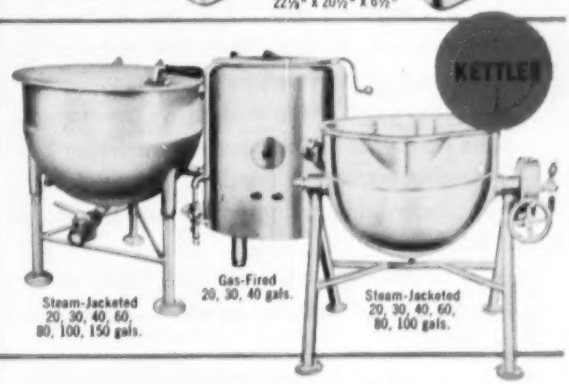
GENERAL AMERICAN TRANSPORTATION CORPORATION

135 South La Salle Street • Chicago 90, Illinois • Service Offices In Principal Cities • Service Plants Throughout The Country.

Leaders in Aluminum . . . for the *FOOD* Industry

WEAR·EVER ALUMINUM





Want to speed production? Simplify your handling or storage problems? Standard, readily available items like these may be your answer.

All Wear-Ever plant service items are made from a specially developed, tough, hard-wrought aluminum alloy to assure long service life.

Send for your copy of our catalog showing the full Wear-Ever line.

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The Aluminum Cooking Utensil Company, Inc.
308 Wear-Ever Building, New Kensington, Pa.

GENTLEMEN: *I'd like to learn more about ways in which Wear-Ever's line can help me.*

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THE ALUMINUM COOKING UTENSIL CO., INC., NEW KENSINGTON, PA.

Sugar by pipeline

...material handling at its simplest

"Every time you handle material," explains your Flo-Sweet Engineer, "it costs you money. When human labor is involved, it can cost you *big* money.

"That's one of the reasons we developed the Flo-Sweet liquid sugar system. Sugar by pipeline is material handling at its simplest . . . material handling that is most economical, too.

"Of course, Flo-Sweet liquid sugar gives you other advantages as well as economy. Sanitation, for instance. The sugar travels in a sealed system from our refinery right into your own process. And the cleanliness inherent in Flo-Sweet sugar by pipeline helps tremendously in your own plant housekeeping, too.

"When it comes to quality . . . Flo-Sweet liquid sugars are tops in the industry — in some respects even superior to granulated. Why don't you look into *all* the advantages of Flo-Sweet — right away?"

REFINED SYRUPS & SUGARS, Inc.

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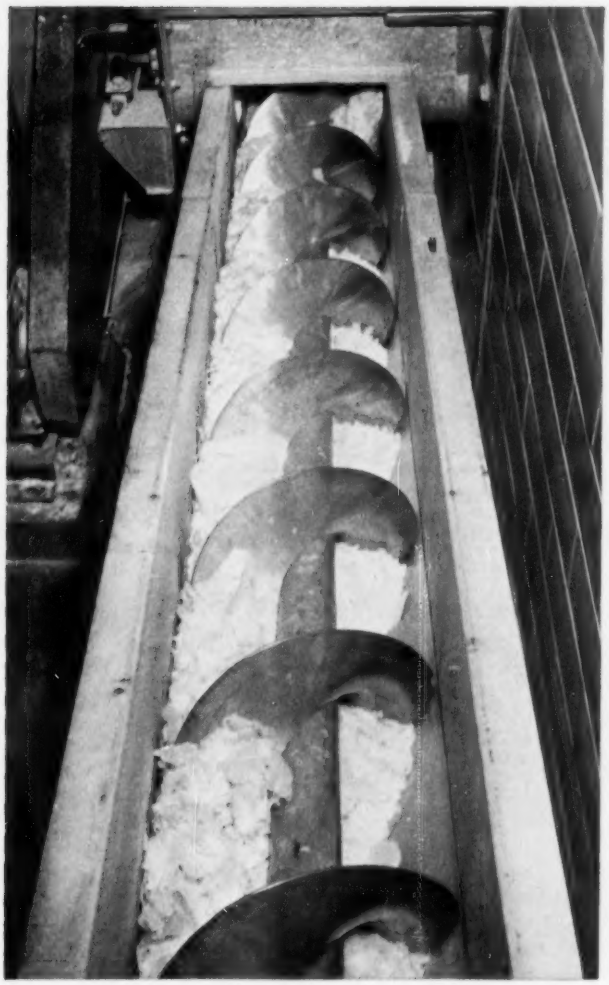
FLO-SWEET
FIRST IN LIQUID SUGAR

SERVING INDUSTRIAL SUGAR USERS EXCLUSIVELY
FROM YONKERS — PITTSBURGH — TOLEDO — DETROIT

LINK-BELT offers you COMPLETE, ONE-SOURCE SERVICE

for all your screw conveyor needs



Spotless, galvanized screw conveyor (cover removed) provides efficient, sanitary means of carrying flaked, edible material to bucket elevator and further processing.

How this 4-phase service saves you time . . . spares you details

1. **ANALYSIS AND ENGINEERING** service is provided by a district sales office in your area. From long experience, Link-Belt District Engineers can quickly ascertain the best conveying arrangement for you.

2. **COMPLETE LINE OF SCREW CONVEYOR COMPONENTS** and related elevating, conveying and power transmission equipment is your assurance that specific needs will be fulfilled most efficiently and economically.

3. **EASY ERECTION** is achieved because of prefitting, match marking, close-tolerance manufacturing and Link-Belt drawings. Link-Belt will handle entire erection assignment if you wish.

4. **SATISFACTORY PERFORMANCE** is assured when you rely on Link-Belt as a single contract source for your complete system. We will accept full responsibility for placing it in operating readiness.

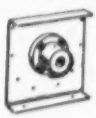
SCREWS

HANGERS

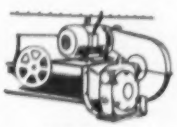
TROUGHS

SPOUTS & GATES

SHAFTS & COUPLINGS



TROUGH ENDS



DRIVES

Here's a four-point program that provides quick and easy answers to your screw conveyor problems whether minor or complex. Whatever you need in components . . . and to whatever extent you require engineering supervision—Link-Belt will devise a system "tailored" to your requirements, correlating all factors to assure you of finest performance. For more facts, call your nearby Link-Belt office.

LINK-BELT

SCREW CONVEYOR EQUIPMENT

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office: New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World.

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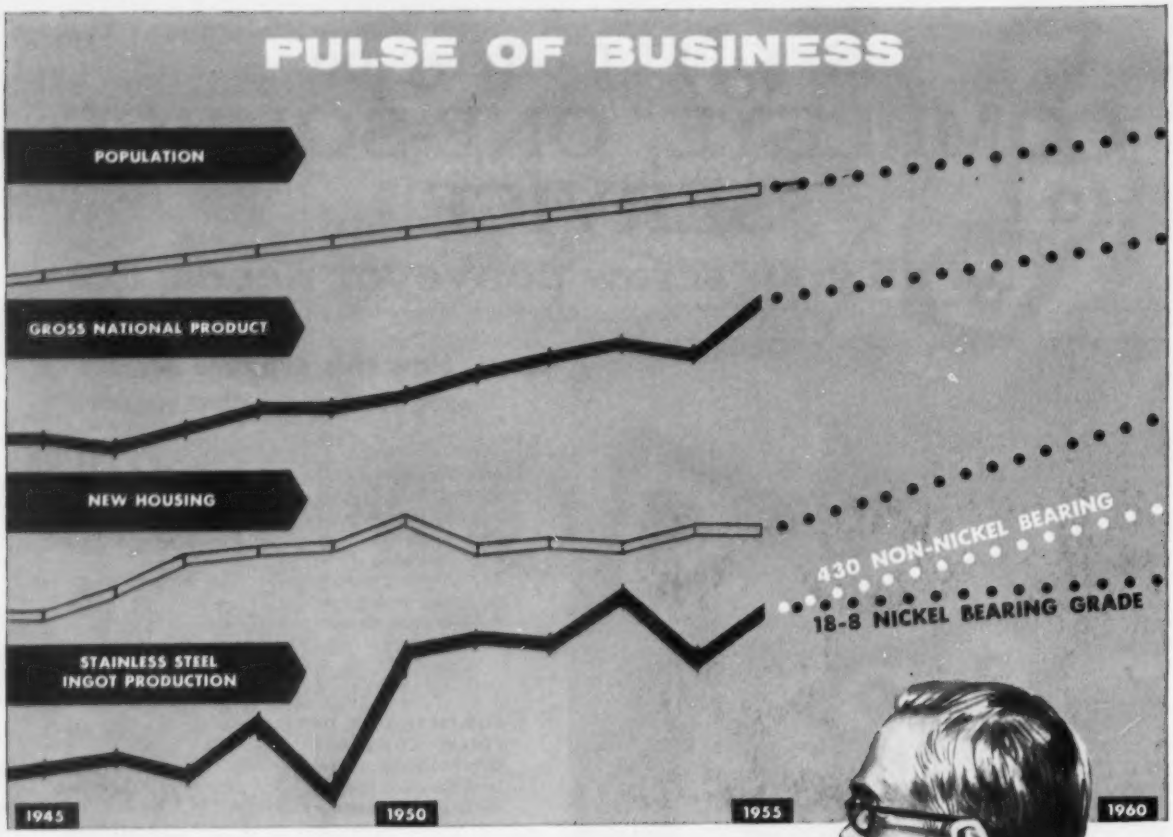

Now! you can grow with your markets

. . . because Washington Steel Corporation has taken two big steps forward:

1. **Making available an adequate and dependable source of supply for Type 430 stainless steel.**
2. **Reducing the base price of Type 430 sheets to provide you with savings of $200 per ton as compared to Type 302 stainless sheets.**

Many designers and fabricators who are currently using Type 302 stainless can, in numerous applications, specify Type 430 straight chromium stainless and take advantage of the 10 cents per pound difference in base price. Some of our customers are already saving more than $200 per ton using our 430 MicroRold stainless steel.

The steel industry estimates that 50% of all stainless sheet applications could satisfactorily employ Type 430, the least expensive of all stainless grades, as an economical and practical material. When properly applied, Type 430 has all the desirable qualities of beauty, corrosion resistance, strength, long life and low maintenance that no other material, *except* stainless, can offer.

We are currently producing our MicroRold Type 430 sheets in thicknesses .005" to .109" with 2B or 2D finishes; and in thicknesses .010" to .109" in No. 3, 4 and 7 finishes.

Type 430 sheets are immediately available for delivery without restriction.
We are supplying the 18-8 grades against rated orders only.

Washington Steel
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8-W WOODLAND AVE., WASHINGTON, PA.

Send for your copy, "Care and Use of 430 Stainless"

NEW LIFT... LONGER LIFE FOR YOUR PRODUCTS WITH FIRMENICH POWDERED FLAVORS

New and improved techniques of process drying, exclusively employed by Firmenich, yield powdered flavors that flow freely, are dust free, and give you the finest precision in flavoring your products. These important developments in quality flavoring will improve the taste appeal of your products . . . extend their shelf life . . . give them package-to-package uniformity that captures customer preference. Samples of Firmenich Powdered Flavors, with technical information on their practical application, on request.

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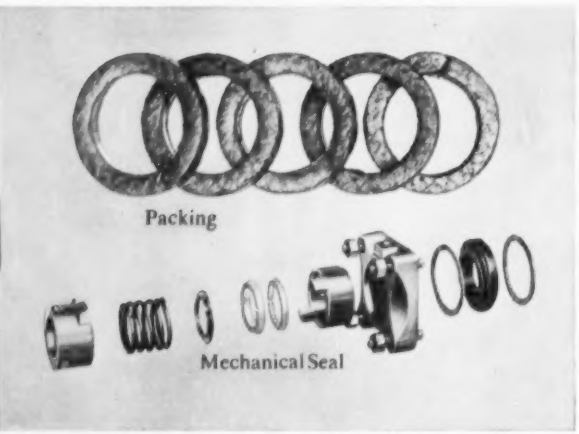
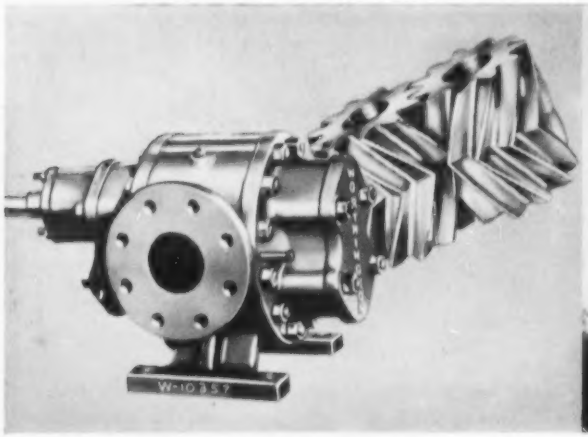
WHAT'S YOUR P.Q.?*

*PUMP QUOTIENT



Pump standardization—how do you benefit? By standardizing, you can often drastically cut your spare parts inventory. With Worthington's SESC (Standard End Suction Centrifugal) line, you are also assured of immediate delivery from factory or distributor stocks. Because the SESC line consists of standardized "parts" not "pumps," it can be built in many different combinations . . . 70,480 to be exact. For all these reasons, more and more companies are turning to SESC pumps. See bulletin W-300-B4.

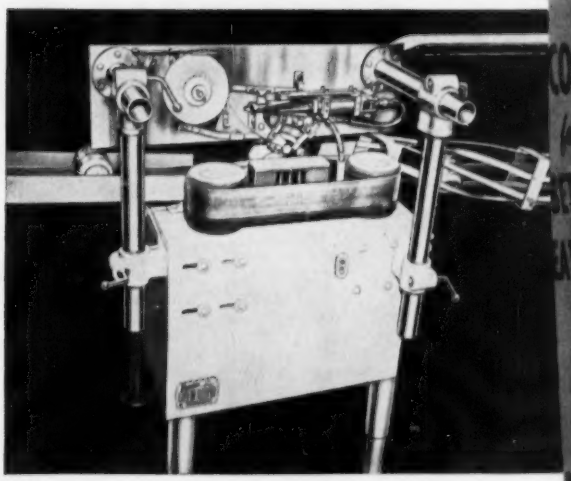
Packed stuffing box or mechanical seal—which is preferred? Each has its applications. Mechanical seals are gaining in popularity year after year. With Worthington's Standard End Suction Centrifugal pumps you not only get your choice of mechanical seals—or packing—but you can easily convert from one to the other using standard stock parts. This "interchangeability" is just one of the many extra advantages of Worthington's SESC line. For more details write for bulletins W-300-B4 and W-350-B16.



Which pump is best for difficult suction conditions? Worthington's close-clearance rotary pump is self-priming and can operate under vacuums as high as 28 inches of mercury. The large unobstructed suction opening in this herringbone gear pump permits operation with thin or viscous liquids at high efficiency. The double-helical gears balance all end thrust, eliminate trapping of liquid between gear teeth and provide a quiet, pulsation-free flow at high speeds. For the full story, ask for bulletin W-483-B2.

Whose pumps would you expect to find in the Eiffel Tower? If you said "Worthington's," your P.Q. is all right. The original steam-driven pumps that power the Eiffel Tower's 100-passenger hydraulic elevators were built by Worthington back in 1889. The most recent additions, modern electric-drive Worthington pumps, moved into the Tower just last year. Today as then, wherever men must move liquid, they turn to the company with a reputation for performance. Worthington Corp., Harrison, N. J. PC. 6.5

WORTHINGTON



Pfaudler Outsert Applicator attaches message to your package, automatically. Eliminates costly hand labor. Places outfold accurately. Becomes part of production line, between labeler and casing machine.

Now you can

Outsert Leaflets

on packages like this without hand labor!

Revolutionary new machine attaches recipes, contest rules, coupons, etc., *automatically*—up to 220 per minute!

To bring you the sales advantages of *outside message attachment*, without slowing down your production line or using costly hand labor, Pfaudler has perfected the fast-action Outsert Applicator, Model OA-3MC.

This efficient machine puts your message precisely where it belongs on your package. There's no chance of sloppy hit-or-miss location of the outfold covering your brand name or trademark, as often happens with hand labor.

Up to 220 containers per minute

The Pfaudler Outsert Applicator attaches your consumer messages to all cylindrical containers of plastic, glass, paper or metal—2⅝" to 7¼" in length, 1¼" to 6½" outside diameter. (Special designs are possible for containers outside these limits.) Speed varies slightly with container size.

Fits right into production line

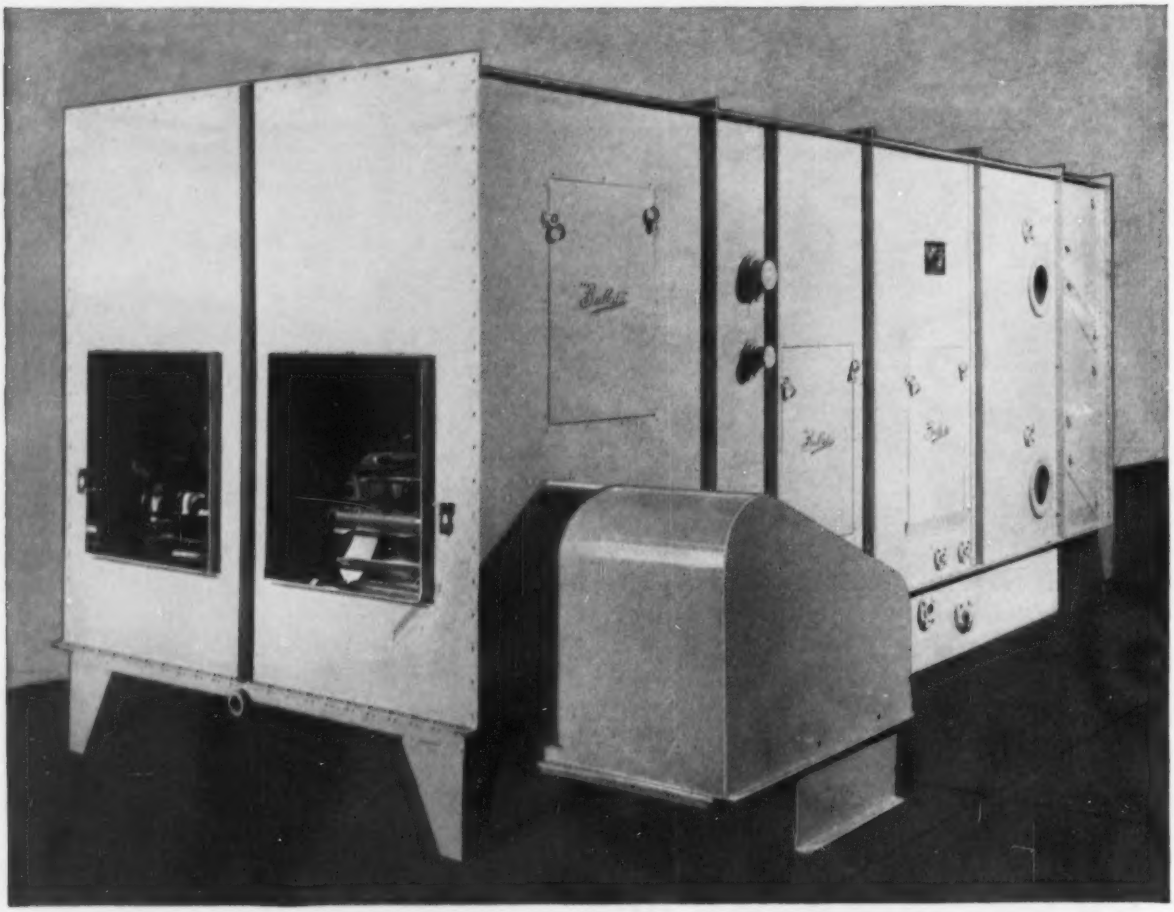
The unit fits readily into most production line setups, requires only four square feet of floor space. There, it works in continuous operation, gripping free rolling containers from your labeling machine and forwarding them, with leaflet accurately attached, to the casing machine, ready to pack and ship.

Low maintenance

Advanced design and careful selection of materials give you a durable machine, capable of long continuous runs. And there are no delicate mechanisms to fail.

If you're interested in the sales advantages of outserts for your product, simply forward a sample labeled container with outsert affixed correctly. Pfaudler engineers will analyze your requirements and send you full information. Or, if you prefer, write for Bulletin 933. There's no obligation, and you're the one to benefit.

THE PFAUDLER CO. **ROCHESTER 3, N. Y.**



"Buffalo" Type PCGW Wet Cell Air Washer with fan, reheating coil, washer, tempering coil and filter section.

For the Climate Your Process Thrives in!

"Buffalo" Air Conditioning Equipment offers you the two factors necessary to maintaining the most favorable air conditions for your particular processes:

(1) **COMPLETE FLEXIBILITY** for any heating, cooling, humidifying, dehumidifying, washing and filtering requirements you may have. "Buffalo" Air Washers, Wet Cell Air Washers and Washed Coil Dehumidifiers are available in a complete range of models and sizes.

(2) **THE "Q" FACTOR** — the Built-in Quality that provides trouble-free satisfaction and long life, including the best engineering features to come out of our 78 years of experience in air handling. WRITE FOR BULLETINS 3142-E, 3457-B and AC 320. You'll find features like quiet, efficient "Buffalo" Pumps and Fans — famous "Buffalo" non-clogging spray nozzles — quality coils — heavy-duty sectionalized construction for easy installation and maintenance — all adding up to ADEQUATE, DEPENDABLE CONDITIONING WITH MAXIMUM ECONOMY. *Write for these Bulletins today!*

"Buffalo"

BUFFALO FORGE COMPANY

BUFFALO, NEW YORK

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

VENTILATING — FORCED DRAFT — AIR CLEANING — COOLING — AIR TEMPERING — HEATING — INDUCED DRAFT — PRESSURE BLOWING — EXHAUSTING

Big savings in imprinting labels & packages–

...with Pitney-Bowes Tickometer

Thousands of companies have reduced their inventories of pre-printed labels, cut printing costs, avoided waste—with the Pitney-Bowes Tickometer.

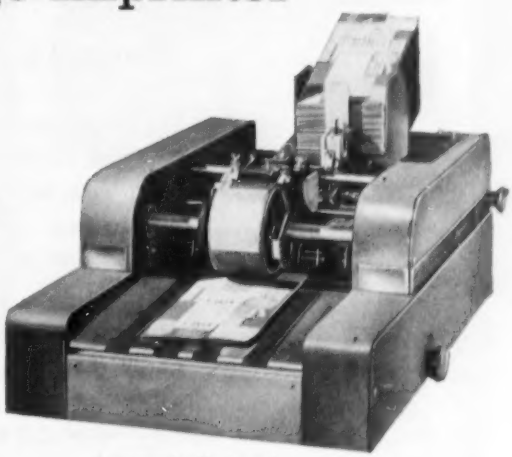
On product labels, the Tickometer can imprint codes, sizes, dates, flavors, weights, specifications, *as needed for current production.* It prints up to 1,000 pieces *a minute,* feeds and stacks automatically. Its printing area is 2¼" x ⅞". It handles sizes as small as 1" x 2", as large as 8½" x 5".

The Tickometer offers unlimited applications for marking, coding, cancelling paper forms, tickets, tags, coupons, checks, etc. And it counts so accurately that banks use it to count currency.

...with PB's New Package Imprinter

Now, you can print packages and cartons only *as needed* currently, eliminate costly inventories, and prevent waste of pre-printed material.

This new Package Imprinter offers big savings, increased efficiency in *high quality* imprinting of cartons, bags, envelopes, containers—at speeds up to 7,500 pieces an hour. Will also *imprint dealer advertising literature.* Its printing area is 4" x 18". Uses rubber mats or metal type from 6 pt. up; and it takes sizes from 2½" x 2½" up to 18" x 18" and thicknesses from .010" to 3/16". Liquid ink needs no mixing, dries instantly. The register is accurate. Has large capacity, and power stacker. Easily adjustable without tools, and can be operated by anybody. Saves time and money in any packaging operation.



Automatically imprints at speeds up to 7,500 items an hour.

For a demonstration of either the Tickometer or Package Imprinter, call any Pitney-Bowes office. Or send coupon for free illustrated booklets and helpful case studies.

Pitney-Bowes, Inc.

Made by the originators of the postage meter ... offices in 94 cities in U. S. and Canada

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☐ *Send free Tickometer booklet & case studies*
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are your steam traps ready...

for peak demand in the winter months?

Don't risk the possibility of equipment failure . . . even freezeups. Check your steam traps right now, before the first frost. Drain them, take them apart, make sure that all parts are working and free from corrosion.

Of course, if you already use Nicholson steam traps, you're in luck. They completely drain themselves when cold. And with just three parts, they're the simplest traps to look after when a checkup is in order.

But regardless of what traps you use at the present time, we'll be glad to help you with any problem you may run into in getting your equipment in shape.

Write, today, for your copy of new Bulletin 10-55—for detailed information.

NICHOLSON

W. H. NICHOLSON and Company

TRAPS • VALVES • FLOATS • METAL PARTITIONS
LAUNDRY, DRY CLEANING AND PRESSING MACHINERY

14 OREGON STREET, WILKES-BARRE, PA. • SALES AND ENGINEERING OFFICES IN 98 PRINCIPAL CITIES

There's MORE

Mill Output with Rib-Type MOTORS

Ralston Purina Chows are kept moving with Allis-Chalmers MOTORS

Rib-Type Construction gives Allis-Chalmers motors up to 43% more cooling surface — as compared with standard designs.

The Ralston Purina Company, long noted for its high quality products and modern processing methods, uses a large number of Allis-Chalmers motors in its Harrisburg, Pennsylvania, chow plant.

Throughout the industry, efficiency-minded millers are specifying Allis-Chalmers motors for a variety of uses—indoors and out. The reason:

Continuous Operation!

- Deep-ribbed frame means efficient cooling. Quickly swept clean of accumulated material — no external air passages to clog. It's hard for mill dust to "suffocate" A-C motors.
- Bearings protected from dust by external rotating seal. Provision for easy relubrication while in service.
- Liberal use of copper means top performance.

To find out more about the MORE in Allis-Chalmers motors, contact your nearby Allis-Chalmers sales office or distributor, or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin.

LIVE BETTER ELECTRICALLY

ALLIS-CHALMERS

A-C ALLIS-CHALMERS

A-5036

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Your juice needs this advantage

Did you know that ascorbic acid may be added to certain fruit and vegetable juices to standardize their vitamin C content, thus overcoming wide variations which can occur *(see table below)*. Many nutritionists believe that the public interest is best served when the ascorbic acid content of processed juices is so standardized. The cost is nominal, the processing simple. A label statement of 100% of the minimum daily adult requirement for essential vitamin C may be made when a serving of juice contains 30 mg. of ascorbic acid.

Why send your juice to market with the "handicap" of inadequate nutritional value? Use Roche ascorbic acid to standardize its vitamin C content. We have helped many processors to make their good foods better and we're ready to help you. Why not investigate today?

Ascorbic Acid Content of Canned Juices

Below are examples of minimum and maximum levels of ascorbic acid in commercially canned juices. Note the wide variations! All figures are in milligrams per 100 grams of juice. Data from U. S. Department of Agriculture.

	Min.	Max.
Grapefruit juice	10.0	49.0
Orange juice	9.7	70.0
Pineapple juice	5.4	18.0
Apple juice	0.2	3.6
Grape juice	0.0	4.7
Tomato juice	2.5	32.0

Orange • Grapefruit • Lemon • Tangerine • Apple • Grape Pineapple • Cranberry • Tomato • Vegetable blends

No matter which type of processing you use—Canning • Concentrating • Freezing • Dilution in the form of "ades"—your juice will be better when its ascorbic acid content is standardized.

New low price of ascorbic acid makes juice standardization more attractive than ever.

keeping faith with nature

ROCHE
ASCORBIC ACID

VITAMIN DIVISION • **HOFFMANN-LA ROCHE INC.** • NUTLEY 10, N. J.
Pacific Coast: L. H. Butcher Company, Los Angeles, San Francisco, Seattle, Portland, Salt Lake City
In Canada: Hoffmann-La Roche, Ltd., Montreal, Que.

Authority or "Authority" And How QC Men Exercise It

Special FE survey reveals that food companies vary from 0 to 100 in the degree of responsibility they invest in their quality control personnel

IVAN C. MILLER

Associate Editor, "Food Engineering"

CONFLICTING VIEWS are held by different food companies regarding the exact working status and place in the organizational structure of those they assign to maintain quality.

Should these people be considered strictly as *staff personnel*, fulfilling only the function of providing information and service?

Or should special authority be invested in these employees, thus qualifying them as *line management* and holding them responsible for product quality?

Or should they go on as "nebulous neithers"—hazy *cross-breeds* between those who write data (staff) and those who carry the sword of authority (line)?

FE Spotlights Picture

To determine current practice in the industry, FOOD ENGINEERING mailed a questionnaire to personnel managers of food companies in the medium- and large-size groups—200 employees and bigger.

What we learned from the returns surprised us. And we think it will surprise you, too. Put briefly, the results indicate a most heterogeneous approach by the food industry to the problem of maintaining quality.

The questions and responses—

Question 1. Do those assigned to quality control in your plant have the authority to issue orders direct to employees?

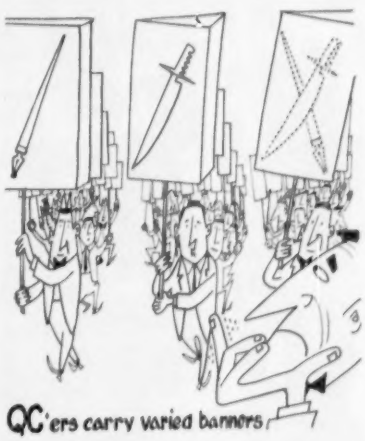
Approximately 25% of the replies were "Yes." One respondent, however, qualified: "Yes, but only in an emergency."

At the end of the questionnaire, comments were invited. And some 75% added their views.

One who replied "Yes" remarked: "To be effective, the quality control manager or supervisor needs the authority to deal directly with foremen or with production employees where product quality is concerned. To maintain this authority, however, the quality control man must demonstrate that he will not halt production for trival variation, but only when a serious situation develops."

But quite the opposite view was expressed in this comment:

"You can't have quality control people issuing instructions to operators, changing operations, etc. Soon you'd be in a mess with conflicting orders. The QC man spots slips in quality and points out to the foreman where operations are out of control. It is then up to the foreman to make corrections. Furthermore, copies of quality control reports should be sent to the superintendent."



QC'ers carry varied banners

From another who said "Yes":

"We do not have a separate quality control department. Quality control is handled by the line supervisors, who give orders to foremen and others in direct line of authority."

Question 2. Do those you assign to quality control have authority to issue orders to line supervisors or foremen?

All answered this question, some 46% of them indicating that the QC people in their plants were granted this authority.

One who said "Yes" added: "But more often the order is given to a production manager."

Another threw in this comment with his "Yes":

"At our plant, production people and quality control people report to different vice-presidents, who are at headquarters in another state. We work together, of course, but QC people can shut down the plant if they want to. This they have never actually done. But they have stopped production briefly at times."

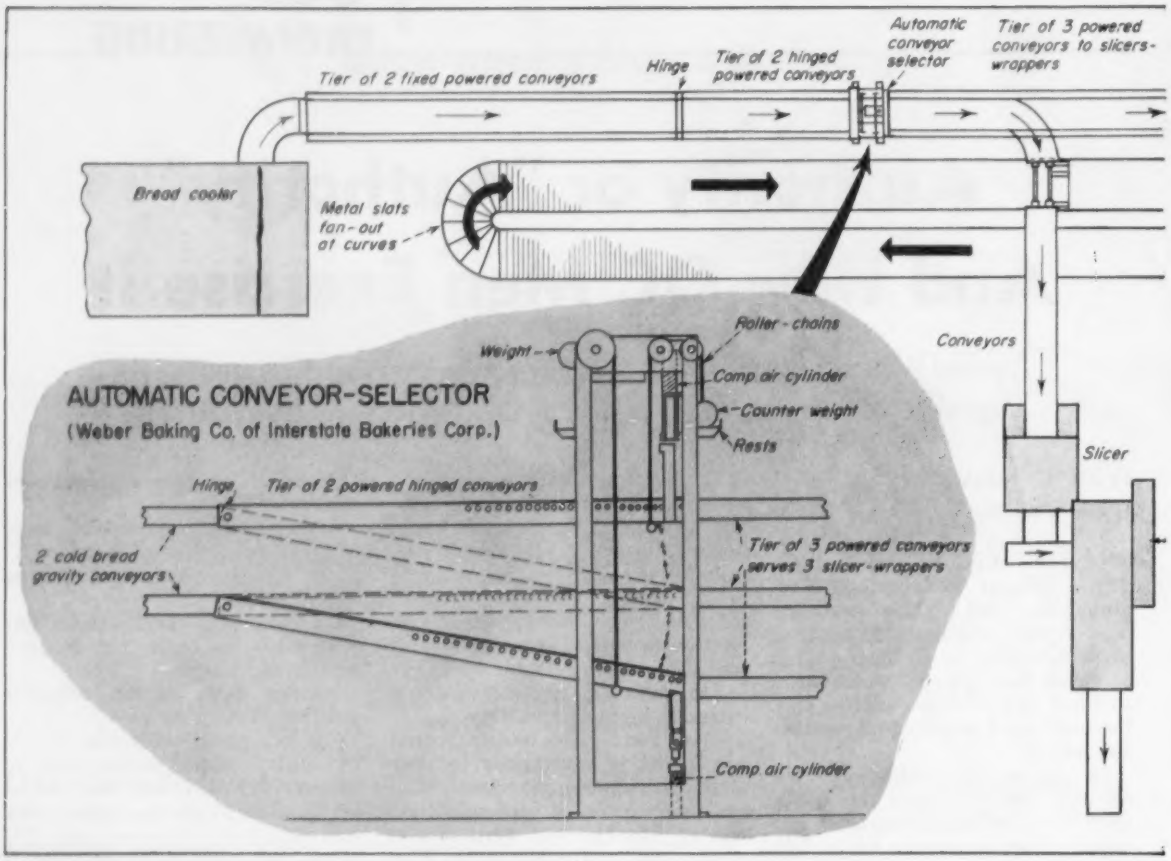
On the other side, a "No" respondent explained:

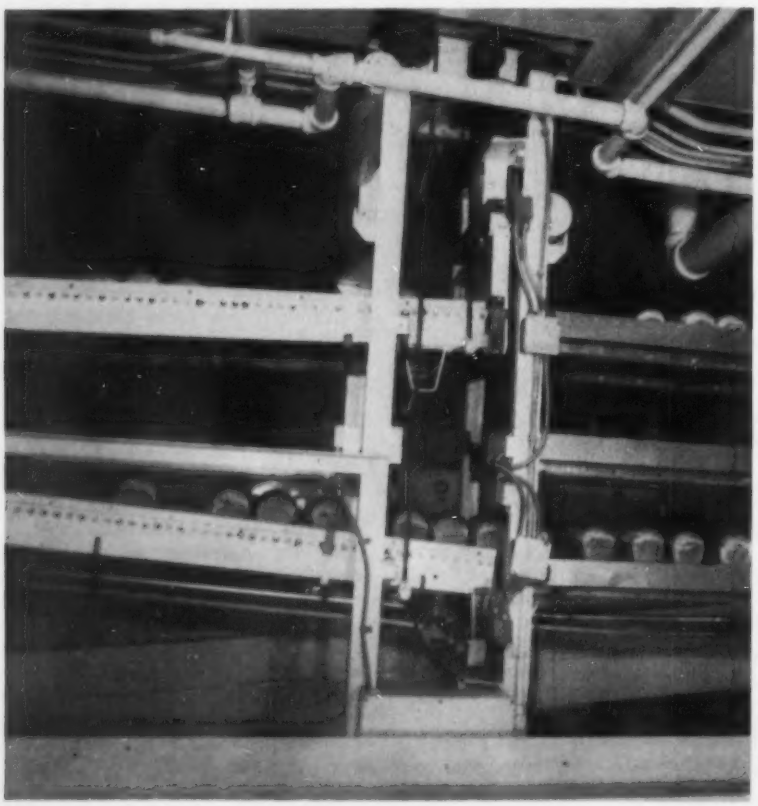
"Our production department, from superintendent down, is responsible for the quality of our product. We have a complete and well organized QC department under the technical director, who establishes standards and tests for conformance. Beyond this, the QC department's function is purely staff—not line."

Another "No" man indicated that from his viewpoint he has the QC department 'where he wants it.' He said: "In this plant, the person heading quality control is in a staff position, answerable to the plant manager. He is responsible for product specifications and checks property data of finished goods to determine if they conform. He has little or no contact with the operating personnel and therefore creates no personnel relations problem."

In the case of still another respondent – one who answered "Yes" – the justification for giving QC orders to foremen is understandable, "since the production superintendent is in charge of our quality control department." He went on: "The quality control

(*Turn to page 99*)





HEART OF CONVEYOR-SELECTOR. Either of the two hinged conveyors (left) are automatically elevated or lowered to serve respective fixed conveyors in the tier (right) that feeds to three slicer-wrappers. Compressed air cylinders (90 psi.), assisted by 100-lb. counterweights, swing the selective carrier units into place. Thirteen Microswitches control the automatic operations.

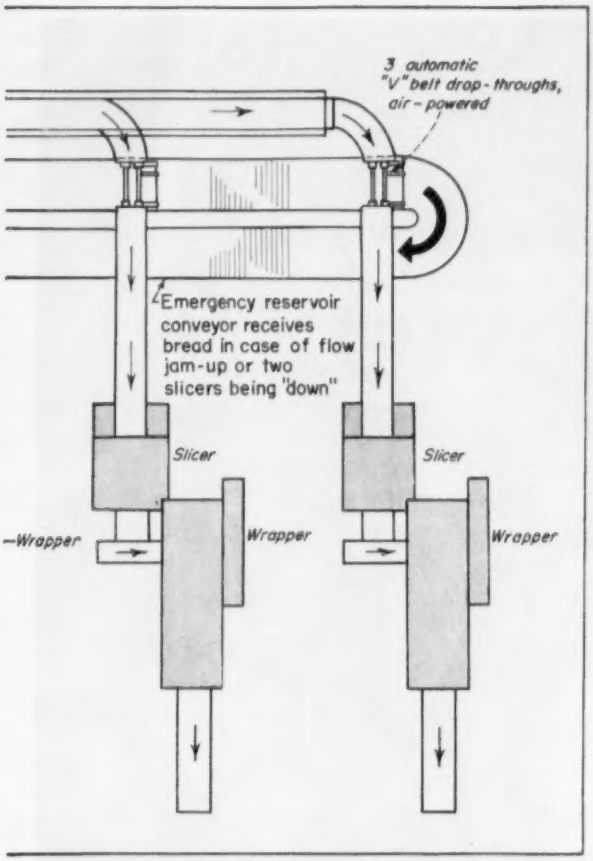
JOHN GLOVER and C. R. HAVIGHORST

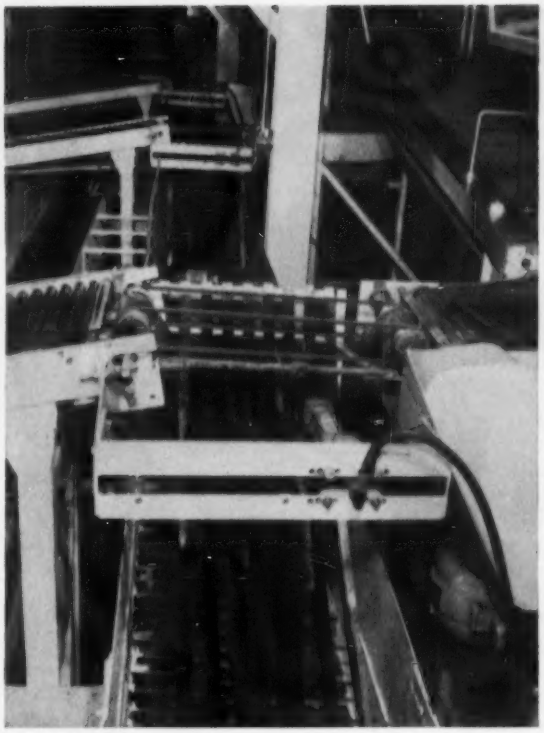
Respectively, Division Engineer, Interstate Bakeries Corp., Los Angeles, and Senior Associate Editor, "Food Engineering"

COST-CONSCIOUS bakery engineers are now slashing materials-handling costs and smoothing product flow with electro-mechanical controls.

This automatic conveyor-selector at Weber Baking Co., Glendale, Calif., has mechanized the handling of bread from the dual-discharge cooler to three slicer-wrapper operations.

Specified by the parent company,





ON EACH CONVEYOR LINE there's a "V"-belt drop-through (center) that opens whenever a slicer shuts down. Thus, pile-ups of product are avoided, for the loaves then gently slide down steel ribbons to a merry-go-'round reservoir conveyor.

Product Movements Robotized By Conveyor-Selector

Ingenious Interstate Bakeries system automatically chooses and actuates tiered carrier units for "just right" flow of its newly baked bread to slicer-wrappers

Interstate Bakeries Corp., and engineered and installed by Read Standard Co., the selector smoothly and automatically shifts the flow of cooled bread from either one of the dual conveyors to an alternate conveyor in the tier of three which feeds slicer-wrapper units.

Closeup of Conveying System

This conveying shift, formerly done manually, saves 50% of the slicer-wrapper operator's time, which he now devotes to wrapping and product control.

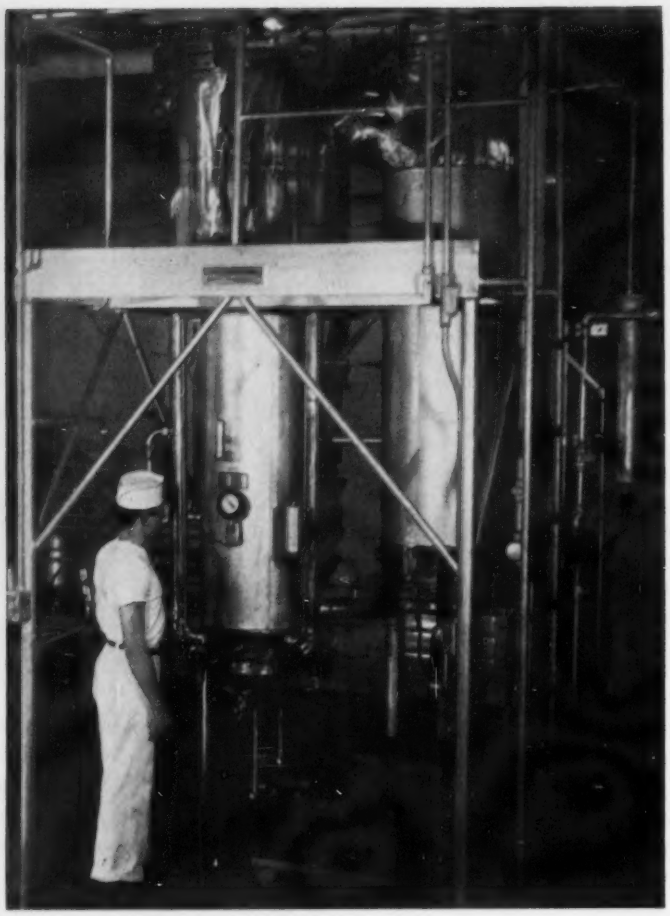
This tiered system of chain-driven roller conveyors (see diagram) incorporates two fixed conveyors leading from the dual-discharge bread cooler. These connect with the two hinged conveyors that are part of, and controlled by, the automatic tier selector. In turn, these two connect with two of the three fixed conveyors. The upper of the two hinged conveyors may "select" one of the two upper fixed conveyors, while the lower hinged unit "selects" one of the two lower ones.

As a safety measure, the 3-tiered conveyors move bread across "V"-belt drop-throughs, from which the product slides into a reservoir conveyor. This merry-go-'round conveyor has a capacity of 1,000 loaves, approximately 9 min. of operation.

The axles on which the drop-throughs operate are extra long. One set of pulleys are fixed to this axle. The other two may be moved automatically by a bar, operated by a compressed air cylinder, so that the belt moves in or out of the flow. When in, bread is conveyed across the drop-through. When out, bread falls through this aperture.

(*Turn to page 175*)

1 IN THIS HTST unit, fresh whole milk is heated to 270F., held 3 sec. (Chicago Stainless Equip. Co.)



2 EVAPORATOR, with indirect condenser, reduces volume two-thirds. (Mojonnier Bros. Co.)

Process Innovations Improve Fresh Milk Concentrate

New technique employs dual HTST treatments, low temperature evaporation, aseptic canning to give six week shelf life at 45F. Acceptance studies give reconstituted product high consumer rating

H. E. CALBERT and A. M. SWANSON

Department of Dairy and Food Industries, University of Wisconsin, Madison

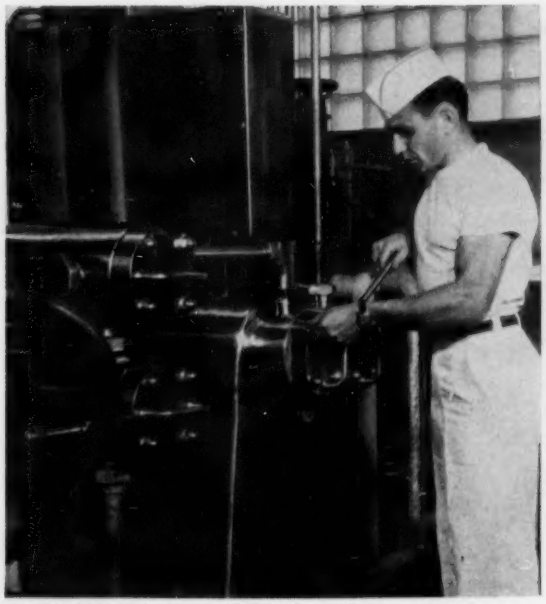
A CONCENTRATED fresh milk that has truly excellent keeping qualities for at least six weeks when held at normal home refrigerator temperature has been developed at the University of Wisconsin.

When the product is reconstituted (one part to two parts cold drinking water), it has all the flavor attributes of fresh whole milk.

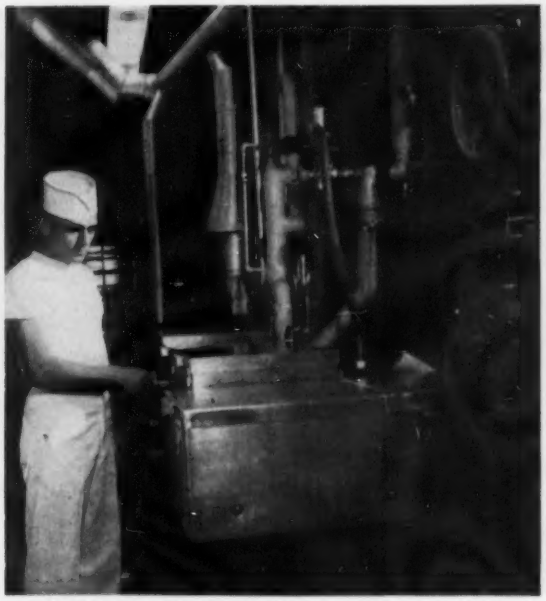
Problems Faced

Fresh concentrated milks do not represent a new development in the dairy field. Some were produced during the '30s. And since World War II, several 3-to-1 concentrates have been sold on various markets.

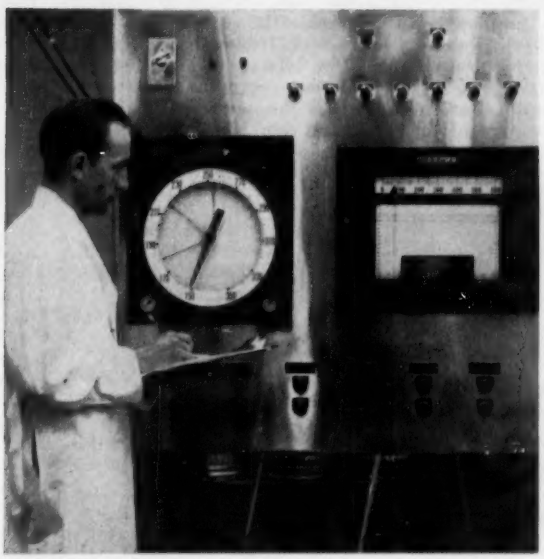
Many of these had an acceptable flavor. However, keeping properties —usually about two weeks under adequate refrigeration—did not exceed those of a good quality whole milk. To extend the shelf-life, it was necessary to go to more drastic heat treatments than normal pasteurization, but



3 **CONCENTRATE** is heated to 220F. in heat-exchanger (center), then shock-cooled to 45F. in unit on stand (left). (Chicago Stainless)



4 **PRODUCT** is filled into sterile cans, which are closed and seamed under sterile conditions in aseptic canning line. (W. F. & John Barnes Co.)



5 **CLOSE CONTROL** over temperatures during heating, cooling, and canning is obtained with these Multi-Point units. (Minneapolis-Honeywell Reg. Co.)

6 **CONSUMER RESPONSE** to the new product, each can of which makes 1 qt. fresh milk, has been gratifying. It was tested as beverage, coffee cream, half-and-half.

such treatments were detrimental to product flavor.

Recent advances in high-temperature, short-time heat-exchangers have been most helpful in overcoming these difficulties. Such units may use small diameter tubes, thin films, scrapers, or direct steam injection for rapid heating.

Available for our development work were exchangers capable of heating milk to 300F. with a minimum 3 sec. holding time. In addition, we used an evaporator that could be operated with product temperature of 100F., and capable of being completely sterilized before using. Facilities were also available for canning the product in sterile containers aseptically.

Findings With Early Studies

During early phases of the research, we subjected the milk to regular pasteurization treatments before condensing. Then high heat was applied to sterilize the resulting concentrate.

These studies demonstrated that:

1. **Increased solids content had a protective effect on organisms in the milk.**

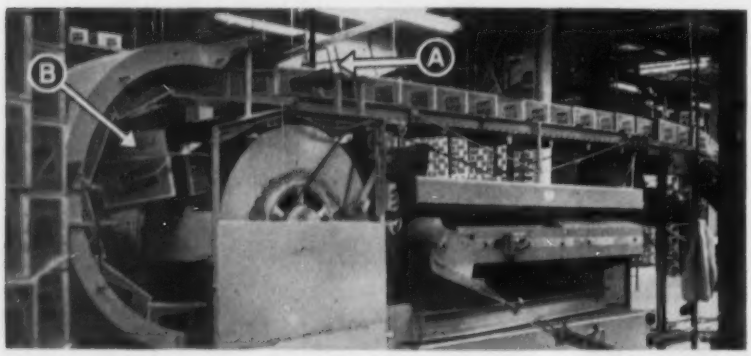
2. **Heat treatment of 3-4 sec. at 255-275F. resulted in a concentrate showing evidence of de-stabilization. It was usually chalky and, in addition, did not have desirable keeping qualities.**

3. **When solids content was re-**

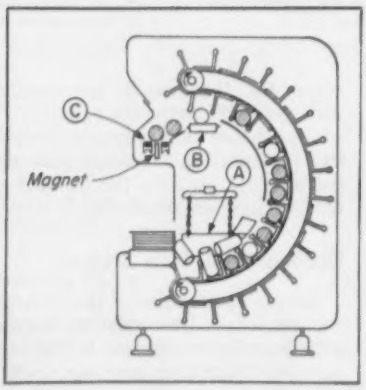
(Turn to page 172)

They Run Cans Double-Quick

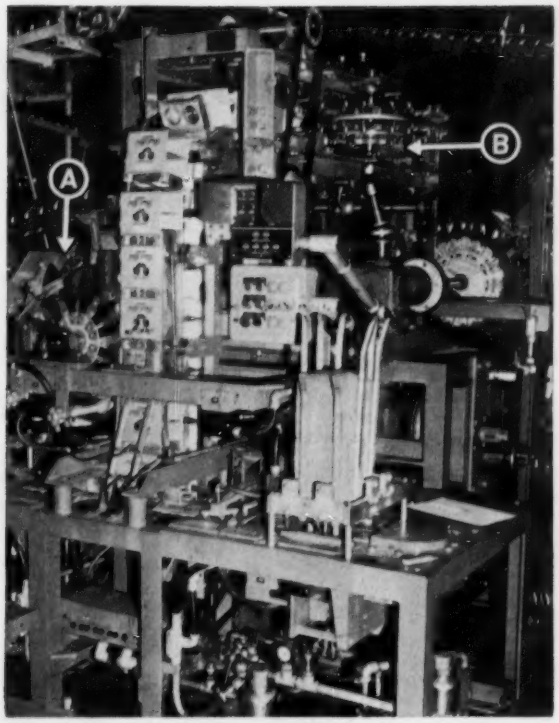
HIGH-SPEED LINES for bottling and canning typify the forefront operations at Carling Brewing Co.'s newest plant in Natick, Mass. Situated in a 32-acre park, next to a lake and a main East-West highway, the 4-building complex is designed with future expansion in mind. Present capacity of 300,000 bbl. can be doubled by simply re-vamping brewhouse space now occupied by offices. Construction is brick, with a stone facing that is applied over structural steel framing. An abundance of chemically pure water, from town wells and the lake, supplies Carling's 1,000,000-gal.-per-day needs. Bottling and canning operations are located in a single-story building (150,000 sq. ft.), set behind the main brewing building. Here, four lines turn out glass- and can-packed products. Two lines (400/min.) run 7- 8- and 12-oz. returnable and non-returnable bottles. The third line (250/min.) takes quarts. But it is the can line (on right in above photo) that merits particular attention. For here, several new machines boost labor efficiency and pep up operating speeds to 600 cans/min. Production starts at the new . . .

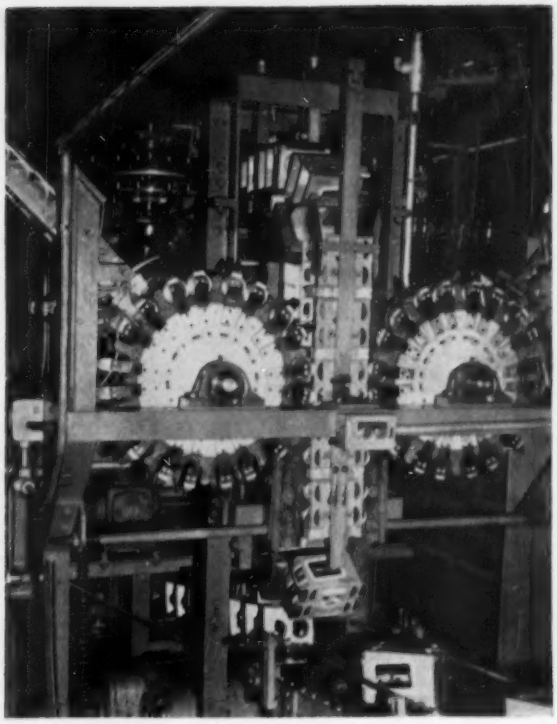


. . . **CAN UNSCRAMBLER.** Cased cans (12- or 16-oz. sizes) enter at top, where compression wheels (A) spring flaps and allow plow to open cases. Cartons slide around chute and end upside down. Here, two belts on the unit (which is sold by Radio Corp. of America) grasp extended flaps and lift case off cans. Empty cases are ejected at (B), and travel to case-off. Cans pass at 800/min.-rate to . . .

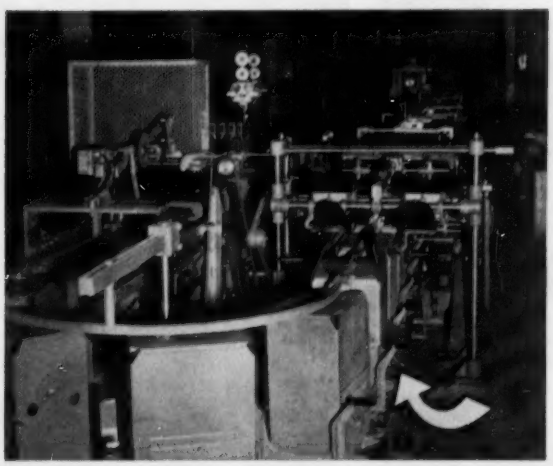


. . . **MACHINE'S SORTING SECTION** (diagrammed at left). Here, rubber-covered steel plates—as at (A)—oscillate to tip cans into an endless rubber-coated elevator. At the top, a belt conveyor (B) moves cans to one end. Then magnets attract cans to a double-V-belt carrier (C) that speeds containers to a special aligning device (seen in photo). At this point, cans proceed around a magnetic drum. It holds solid end of can more firmly than the open end. Thus, air jet (arrow) pivots containers into line—with open ends all facing the same way. Two Microswitches and a photo-eye protect unit, spot bent cans or jams.



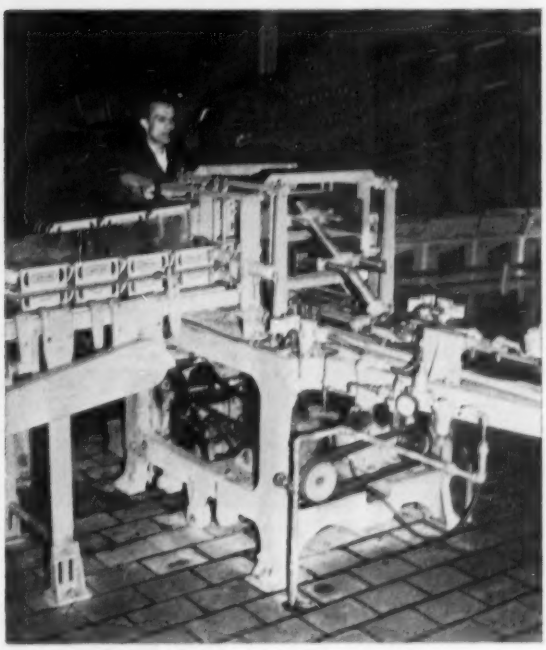


AFTER FILLING AND SEALING on standard, high-speed units, cans are pasteurized and cooled, then inspected by X-ray detectors. Next, they go to a new 6-packer (Johns-Negrelly-Johns). On this unit, can bands are opened by vacuum cups at 100/min., and slid into a continuous carrier (left photo). As the two-part cartons rise, a single can is inserted in each section by rotary feeding device (A). Continuing, these cans are centered in bands by two special starwheels—as at (B). On opposite side of cartoner (right photo), two more feeders insert four outer cans into descending bands. Feeders contain spring-clips that grip cans and intermesh with cartons. Completed packs drop on belt and go through beam of a photo-eye, which stops 6-packer if line backs up, then on to . . .



OF ADDED INTEREST is this giant carousel case-maker that forms shipping cases for all bottled products. Flats are opened and dropped over steel forms (as at arrow), then pass through flap-folding and gluing stages at 60/min. Special tuck-in flaps on "returnable" cases are made by extra side rolls and glue pots. No changeover parts are needed for different case sizes. Glue pots are merely repositioned. When case is finished, it ejects automatically onto a conveyor leading to bottle lines.

. . . **THIS NEW CASE PACKER** (Standard-Knapp). Here, two-level belts position 6-packs. Double strokes of a ram load cases.

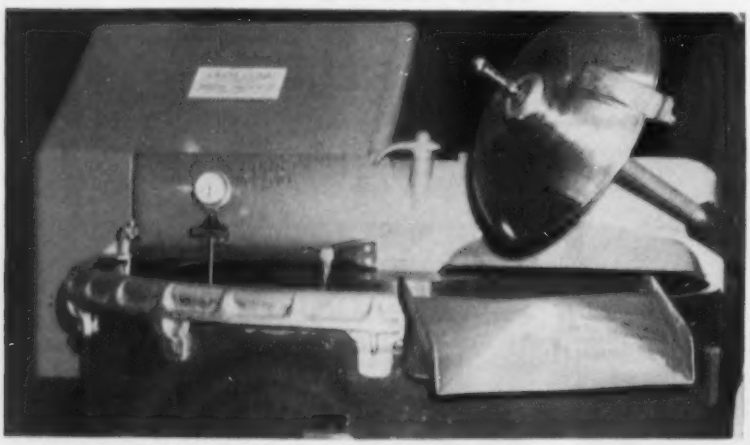


Packers Check

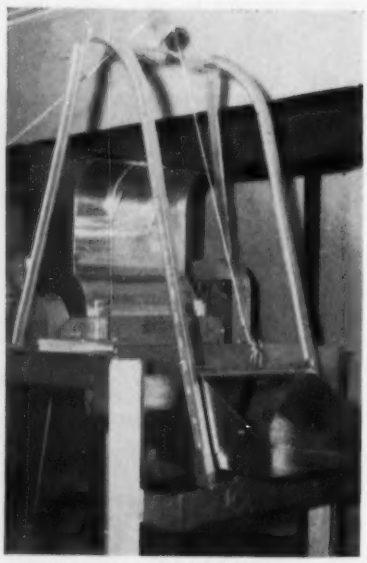
5 Cutters

GERMAN-MADE CUTTER eliminates sausage-kitchen grinding and mixing operations and still produces fine emulsion in 1 to 4 min. Handles frozen or unground meats in up to 350-lb. batches. Is equipped with two shafts, each having 7 counter-rotating knives. Has counter for presetting rotations of bowl, also automatic shut-off, temperature control, and four outlets for feeding metered water. Exhibitor: Barliant & Co., Chicago. (50A)

NEW COLLOID MILL reduces fresh, ground, unscalded beef lips, and other low-cost edibles, into high-binding quality emulsion at 3,000-lb./hr. rate. Features rotary knife (driven at 3,500-rpm.) within slotted sleeve to provide shear and attrition actions. Used also to make fine-consistency braunschweiger liver sausage and extra fine wiener and bologna batter. Displayer: Kolloid Mills, Inc., of Marhoefer Packing Co., Muncie, Ind. (50B)



SPECIAL CUTTER chop-cuts whole chunks of frozen meats. Versatile unit is available in 350- and 700-lb. sizes. Built to make all sausage products, it requires less ice and more water. Manufacturer: The Cincinnati Butchers' Supply Co., Cincinnati. (50C)

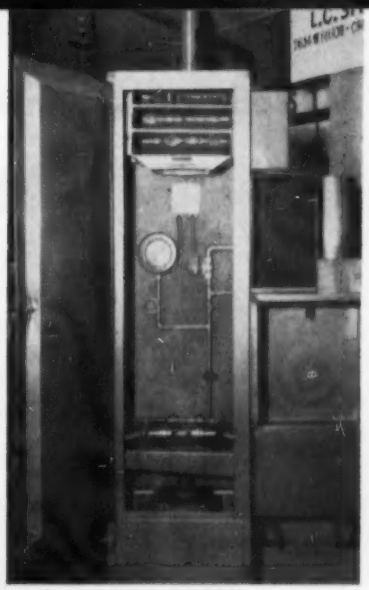


SHREDDING MACHINE reduces 100-lb. blocks of frozen meat directly from freezer into shreds in 20 sec. It's single operation abolishes thawing, slicing, or grinding. Shreds meat without crushing or loss of meat juices. Pneumatically-operated, unit comprises elevator tray on which meat block is automatically raised along guide rails for feeding into hopper of shredding machine. Maker: A. W. Hughes, Elmhurst, Ill. (50E)

FRICTION-FREE Oilite bearing ring (arrow) insures longer plate- and knife-life on meat grinder, also better meat cuts. Ring holds plate and knife in perfect alignment, and reduces meat-temperature rise, since the friction-free center bearing dissipates heat to bowl instead of product. Unit ups life of feed-screw stud and lowers power consumption, also assures cleaner cutting. Maker: Speco, Inc., Schiller Park, Ill. (50D)

Newest Units

On view at National Independent Meat Packers 15th annual show were 16 new cutting, smoke generating, packaging, forming, slice-stacking, breading, and packaging aids



FIRELESS, friction-type smoke generator takes only about 3 min. to fill smokehouse. Smoke is generated by rotating a bladed disk against weighted, hardwood log. (See article, FE June p. 65)—L. C. Spiehs Co., Inc., Chicago. (51A)

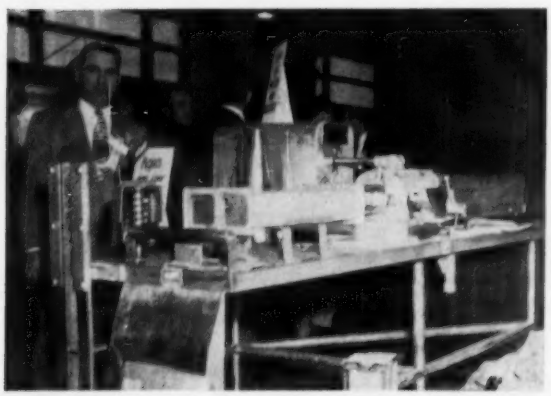
Pack Holder, Formers, Slicer

MACHINE heat-seals vac-packaged sliced luncheon meats to specially designed rigid pack holder. Packaged meats are inserted in pack holder and fed onto chain belt conveyor (with eleven 6-in. centered flights) going past top and bottom temperature-controlled heat-sealing plates and top-riding compression roll (2½-in. dia.).—Marathon Corp., Menasha, Wis. (51B)

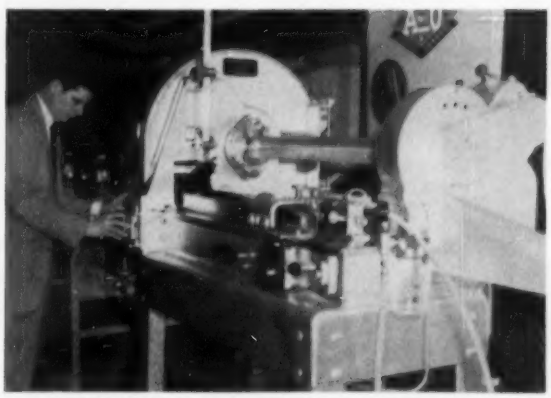
PATTIE-FORMING MACHINE attaches to grinder for automatic shaping of ground meats into beef, pork, veal, ham, chicken, and other type patties that drop onto a strip of roll-fed waxed paper. Available with attachable molds to form 3½- or 4½-oz. patties. Maker: Basic Food Materials, Inc., Vermilion, Ohio. (51C)

For detailed data on units circle key numbers on Readers' Service Card in front of book

MORE→



THIS FORMING MACHINE consists of air-operated piston that forces boned, seamed, and fatted hams, one at a time, into dual metal molds. Boiled hams are formed to slice to right size (4x4 in.) for sandwiches. Press is used for picnics and Canadian bacon by changing forming heads.—Meat Packers Equipment Co., Oakland, Calif. (51D)

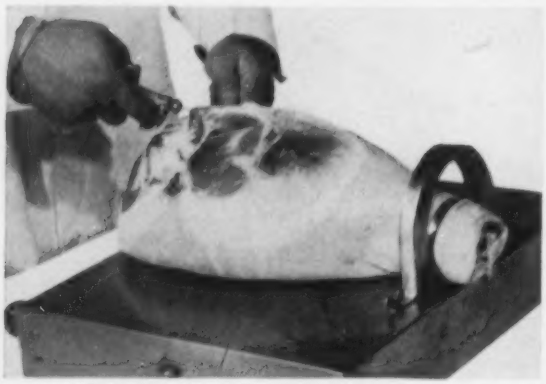


UP TO 1,000 SLICES of molded luncheon meats are cut per minute and stacked at pre-set numbers of 4, 5, 6, 8, 10, or 12 slices. Stacker synchronizes with slicer. Slice thickness is adjusted by vernier dial. Also slice-stacks steaks from 4½-in.-dia rolls and 11/16-in. patties.—Allbright-Nell Co., Chicago. 51E)

Miscellaneous Units

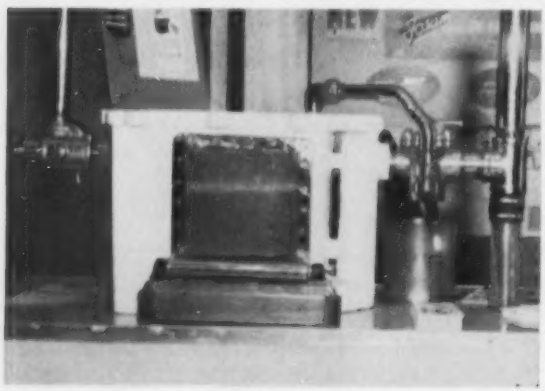
LEVEL-GLIDE breader handles fragile products, fresh or frozen, without dropping, tumbling, or flipping products. Maker: Sam Stein Assoc., Sandusky, Ohio. (52A)

SPECIAL TUNNEL employs recirculating hot air (240F.) instead of hot water dip to shrink bags (plastic type) and form a snug fit over packaged meats. Displayer:—Great Lakes Stamp & Mfg. Co., Chicago. (52B)



SHANK CHOKER is compact unit that prevents costly brine losses during artery pumping of hams and calls. Assures better and more thorough brine penetration.—Global Industries Machine Corp., Brooklyn. (52C)

DEMONSTRATED, here, are chilies packaged in new "boil-in-bag" Mylar-polyethylene Flex-Vac pouch. Secret is a specially formulated laminating adhesive.—Standard Packaging Corp., N. Y. C. (52D)



NEW GREASE INTERCEPTER is designed on low-pressure principle. It automatically discharges grease from unit at turn of valve, and without removing cover. Maker: Josam Mfg. Co., Michigan City, Ind. (52E)

PICKLING TANK is spray-coated with thermosetting epoxy resin to abolish oiling, wire brushing, and corrosion. Built for lift- or fork-truck use.—The Bishopric Products Co., Inc., Cincinnati. (52F)

DAVID N. LEWIN
Lewin Associates, Food Consultants,
New York City

How Explosion-Proof Is Your Plant?

Like accidents, explosions don't just happen, they're caused. . . . But you can prevent them with this carefully prescribed control program that's based on latest knowledge of explosive dusts and use of key protective devices

IS YOUR FACTORY one of the country's 28,000 that the National Fire Protection Assn., Boston, calculates to be subject to explosion hazard?

It very definitely is—if you process, handle, or store the following:

- **Grains, flour, or starches.**
- **Dehydrated fruits, vegetables, milk, or eggs.**
- **Chocolate or sugar.**

Nor is it only certain dusts (as starch, flour, grain) that may cause serious explosions.

Actually, the dusts of all combustible, and some non-combustible, substances are explosive. For example, seemingly harmless powdered raw material in a confectionery plant is combustible, and may develop into a highly explosive dust cloud.

Then what properties of a dust make for explosiveness? How do such explosions occur? And most important, how can they be prevented?

Down to the Data

Valuable contributions to our understanding of the mechanism of organic-dust explosions have been made by the Bureau of Mines. These are major factors:

1. Particle size—Dust particles vary from 0.000001 micron to 100 microns. Those larger than 0.1 micron settle to form static dust, while smaller particles remain suspended.

A related property is surface area of such a cloud, important because combustion occurs at the surface, and its area affects the rate of reaction. To visualize the magnitudes involved, consider that a cloud originating from a single cube of sugar (6 cu. cm.) has an area exceeding 900 acres.

2. Explosive pressure—This is the force applied to walls, floors, and ceilings by a sudden thermal expansion. Values for some common materials (see table) range to 50 psi. and higher. In comparison, your plant's floors are designed for loads that work out to about 2 psi.

3. Rate of pressure rise—Explosive effect depends also upon the speed of pressure development, which varies from 1,000-2,000 psi. per sec. for products listed in our table. However, maximum rates are much higher—up to 8,000 psi. per sec. So an exploding dust can reach maximum pressure in a small fraction of a second.

4. Ignition temperature—This is the minimum temperature at which a material will spontaneously ignite in air at atmospheric pressure. Although these figures are high (1,000 F. range), the energy required for ignition is very small—in the order of 40-160 millijoules.

5. Atmospheric conditions—Room humidity and oxygen content also affect explosiveness. Increasing moisture contents necessitate higher ignition temperatures and energies, while for many kinds of dust, there are critical oxygen limits below which explosion does not occur.

Therefore, explosiveness of a dust cloud depends upon properties of the specific material. And in each case there must be a certain minimum dust concentration—and not necessarily an entire room filled with dust-air mixture.

Danger Spots

Static dust deposited on beams or machinery may be thrown into suspension by a jarring motion. Should it then be ignited, the resulting pressure wave would stir up all other accumulations to produce an explosive dust.

Although many plant explosions result from fires, electric sparks are considered chiefly responsible for ignition of dusts. For the most part, sparks are caused by static electricity. But they can also be produced by electric currents in defective wiring, bulbs, and switches.

Other sources of sparks in the plant are: Loose machine parts, overheated motors and bearings, loose fan blades, slipping belts, friction of a pulley or belt, broken chains, and defective piping.

Equipment such as ducts, dust collectors, and blowers are especially hazardous when they are clogged or defective.

Now—what can you do to minimize such hazards?

Preventive Measures

First, of course, all fire precautions should be observed. Then subsequent steps should be based on the previously noted properties of dusts.

Whatever the ignition cause may be, an explosion occurs only: (I) If there is an accumulation of static dust, (II) if there are clouds of potentially explosive material, and (III) if there is an ignition source.

Therefore, prevention must be aimed at: (1) Complete removal of static dust, (2) curbing excessive accumulations of dust clouds, (3) reducing their explosiveness, and (4) eliminating ignition sources.

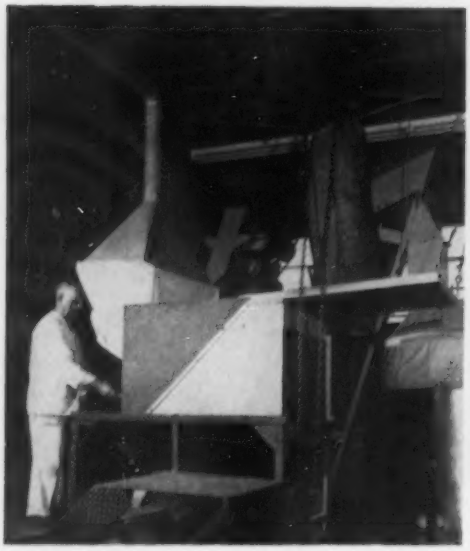
A. Removing static dust – This must be done continually, but is easily accomplished with readily available sweeping apparatus, usually of the vacuum type. Naturally, equipment must be of proper design and capac-

(*Turn to page 143*)

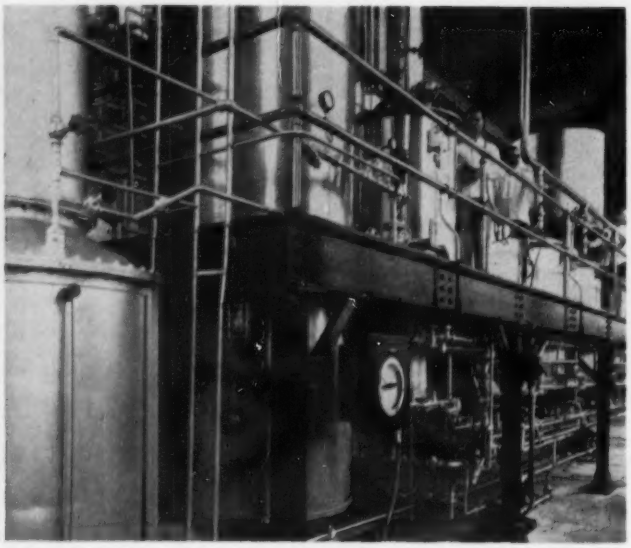
Big Pressures You Face When They "Go Off"

Dust	*Psi.*
Grain	37-46
Sugar	22-45
Starch	38-79
Milk powder	31-42
Cocoa	23-25
Flour	26-42
Rice	40-61
Spices	28-43

Raw materials are ground and extracted . . .



BAGS of ginger roots are hoisted to platform, dumped on sloping screen, visually inspected, ground and elevated to stainless basket (right).



FILLED baskets are moved to adjoining room, lowered into extractors (right) where menstruum is introduced to dissolve flavor. Solvent is recovered from spent roots in units (foreground).

What It Takes to Make

Top Beverage Flavors

Modern equipment, processsing know-how, extensive laboratory checks, continued research, eternal vigilance are combined at new Canada Dry flavor-making facility to insure high quality of bottled drinks

ARTHUR V. GEMMILL
Senior Associate Editor "Food Engineering"

PRODUCTION of uniform, high quality flavors for company and franchise bottling plants in the U. S. and foreign countries is the primary function of the new Canada Dry plant in Greenwich, Conn.

But it also renders these two other very valuable services:

1. Control over quality of final beverages bottled in all Canada Dry plants.
2. Researching into new flavors and products.

Accent on Equipment

Facilities for preparing, blending, and packaging the many flavor extracts—95, all told, for the company's "full line" of quality beverages—are the most advanced obtainable. Some were custom made to company specifications but, where possible, standard units have been employed. Stainless steel is used throughout.

Key operation, of course, is preparation of the ginger flavor for the company's leading product—Canada Dry ginger ale. Used are carefully cleaned, high quality Jamaica ginger roots that are received in 200-lb. burlap bags.

Before going into process, the roots are emptied from the bags onto a ¼-in.-mesh screen set at an angle so they will roll down across it. Fines pass through the screen and are discarded. Roots fall onto a flat stainless surface, where they are manually inspected for tramp iron, stones, etc. Then they are fed to a pulverizer.

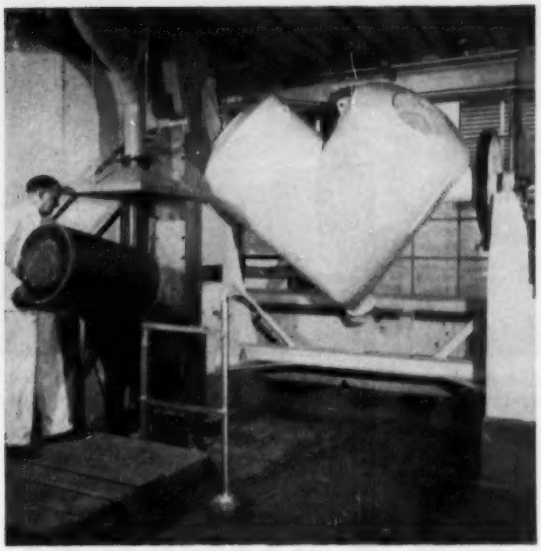
Pulverized roots are elevated and discharged to large stainless baskets having bottoms of fine-mesh stainless screen, along with removable covers of the same material.

When one is filled, the cover is securely fastened. Next, the basket is lifted by an electric hoist (suspended from a monorail) and moved to an adjacent room. Here it is lowered into a large stainless tank, and the tank's cover is closed and tightly fastened.

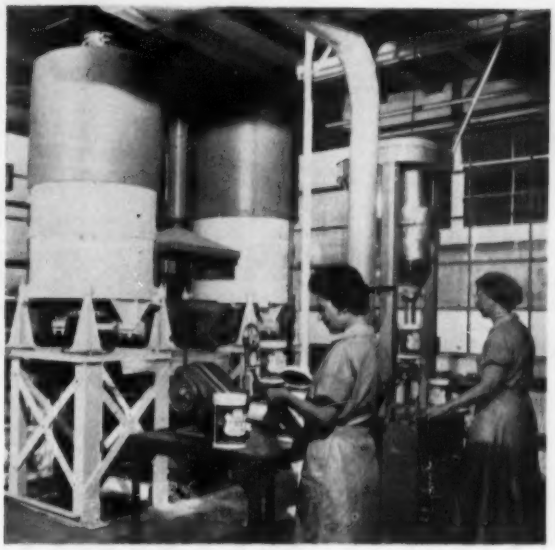
There are six of these tanks in which a special menstruum is used for flavor extraction. Electronic controls govern their operation and, also, the spent root steaming and condensate process, which has features exclusive with Canada Dry.

Quantity of extract from each basket of roots is carefully measured, then the extract is tested. From these results, yield is determined. The extract is then standardized and

. . . then flavors are mixed and packaged



INGREDIENTS for production of sparkling water are mixed in this Liquid-Feed Blender. Then they are drawn off and packaged for shipment to bottling plants.



GINGER EXTRACT is dispersed in dry carrier in the mixers (rear), then packaged in cylindrical paperboard containers and check-weighed (foreground).

filled into stainless drums. Later some of it is mixed with a diatomaceous compound to enable dry packaging. This enables shipment to bottling plants without loss through breakage.

Following steaming to remove menstruum from spent roots, baskets are hoisted from extractors, set on pallets, and emptied by means of a hose feeding a vacuum system. Product discharges to hopper of bag-filling unit, where it is filled into burlap bags for shipment.

Liquid Flavors

Many of Canada Dry's flavor extracts are made and shipped in a liquid form, packed in ½-gal. glass containers.

In their preparation, a number of agitator-equipped stainless mixing tanks are employed. Flavors are blended in these, then heated to sterilizing temperatures. Following homogenization they go to an automatic filler, are capped, and finally the containers are hand packed in cardboard cartons.

Mixing and Packaging

Several types of mixing and packaging units are used, depending on products to be handled.

In the case of dry colors, mixing is carried out in a stainless drum with tight fitting cover. This is mounted on a motor driven shaft that causes it to rotate. To prevent particles of color from getting into the plant proper, this mixer is installed in a small room and has a hood above it which is attached to an exhaust fan.

In this way, the small quantity of dry colors that do escape are removed from the plant. This procedure is applied to all areas in the plant where dust conditions might exist.

Packaging of colors is carried out in a room adjoining the mixing room. Employed is a chemist's balance to insure maximum accuracy.

The previously mentioned dispersion of ginger extract in diatomaceous compound is performed with Simpson

FLAVOR, color, etc., for one unit of beverage syrup is shipped to bottler in a complete package.

Intensive Mixers (National Eng. Co., Chicago). Following mixing, product is transferred to a Stokes & Smith auger type semi-automatic unit for filling into cylindrical paperboard containers. This type container is used for all dry products.

Ingredients for manufacture of sparkling water are mixed in still another unit—a Patterson-Kelley Co. Liquid-Feed Blender—then packaged for shipment.

A special feature of Canada Dry's operation is assembly and shipment of complete flavor units. These comprise

(*Turn to page 136*)

DESIGNED FOR TOMORROW, inside and out, new H. W. Lay & Co. specialty foods plant near Atlanta is the result of creative thinking and advanced food engineering. Striking architecture and landscaped 14-acre suburban setting make plant showplace. Plant has 152,000 sq. ft. of floor space.

GOES ALL-OUT FOR PROGRESS

Sets pace in: Plant design • Layout • Handling • Processing • Packaging • Automation • Waste Disposal • Odor control • Storage • Refrigeration • Materials

WILLIAM E. FREEMAN and FRANK K. LAWLER

Vice-President of Manufacturing, H. W. Lay & Co., Inc., Chamblee, Ga., and Editor, "Food Engineering," respectively.

NO AVENUE of progress was left unexplored. So it is not surprising that H. W. Lay & Co., Inc., achieved pace-setting results in the construction, layout, and equipping of its new $1,800,000 food factory—a showplace on Peachtree Industrial Blvd., 10 miles from the heart of Atlanta.

There are few food manufacturers in the world who cannot borrow some good ideas from this well-planned and engineered plant.

Site of the specialty-foods plant is in an attractive industrial park area at Chamblee, Ga. Lay purchased this site in 1947, after carefully weighing location factors. The area selected affords attractive surroundings. It is out of the congested area, where enough acreage could be purchased at reasonable cost to spread out a 1-story factory—complete with landscaping, parking facilities, and a truck-servicing area—with enough land left over for a 100% plant expansion.

Located on a main highway, the site is convenient for truck and trailer hauling of supplies and finished products. And it is situated where a spur railroad track could be run right alongside the receiving docks.

Other services are there, too, including municipal water and sewage systems, gas, electric power, and fire protection.

Near suburban residential sections, and in a new industrial development area, the site is close to a labor supply. And trolley buses operating out of Atlanta come to within walking distance or a short taxi ride.

Finally, there is enough traffic past the location to give pay-off public relations and promotional value to the eye-catching design of the plant.

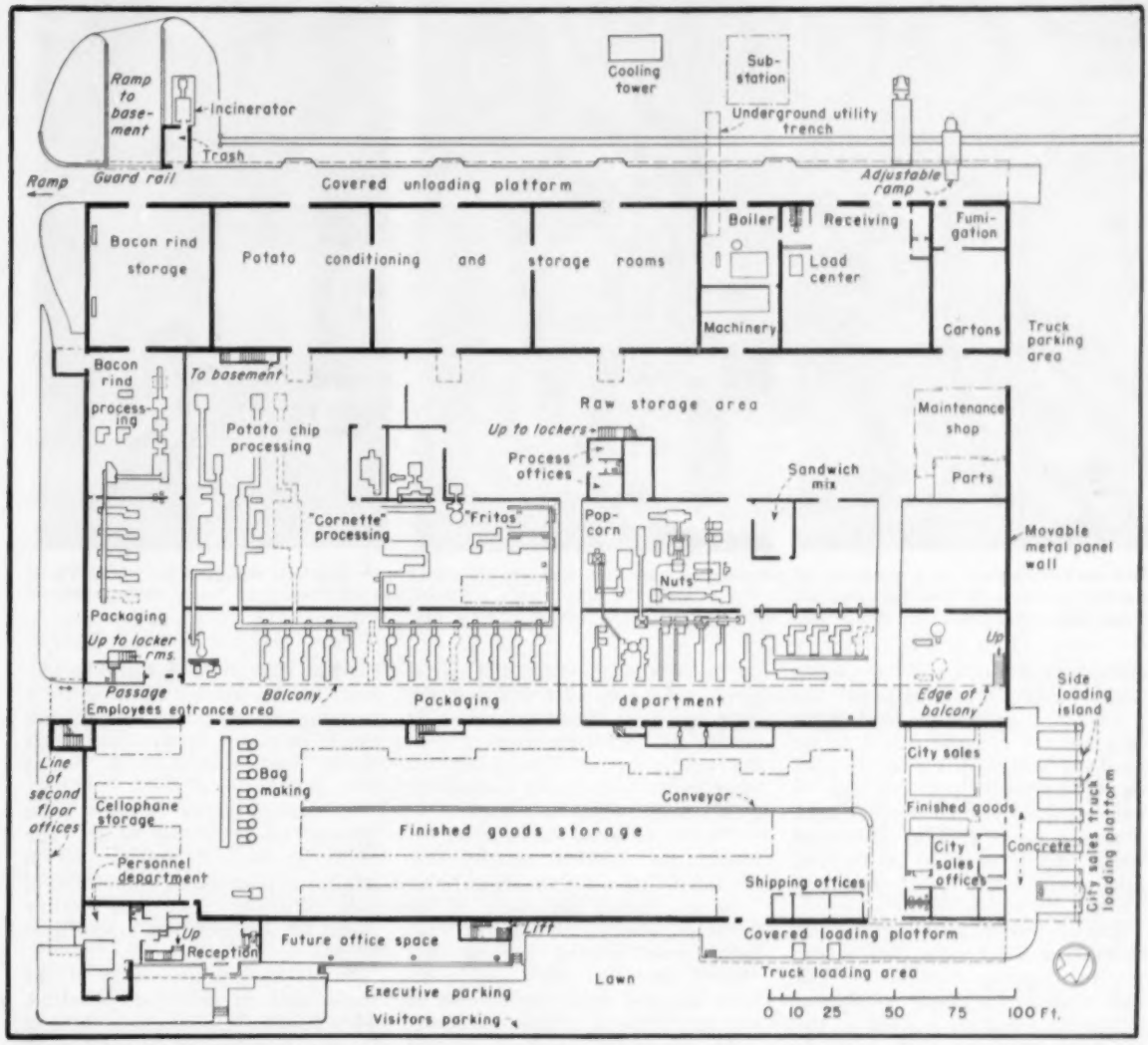
LABORATORY plays key role in Lay operations. It controls quality, develops new products, and conducts basic research in chip making.

EFFICIENT LAYOUT

Highly efficient flow—from unloading platform to materials storage, processing, packaging, finished goods storage, and loading platforms—is provided by a well-engineered plant layout. Materials move cross-wise of the plant for shortest travel.

Potatoes are the biggest-volume product handled, and storage rooms are a short, easy lift-truck run from the processing area. Other raw material storage is separated only by a wall from the corresponding process equipment. The packaging room is next to process area, yet is separated for air conditioning. Processed products are conveyed through wall openings directly to the machines which package them.

A 15-ft.-wide balcony extending the length of the packaging area keeps packaging supplies for a day's run out of way, yet handy by drop racks and chute to packaging lines. The bag-making department, with its own cellophane storage area, is near the packag-



OPERATING EFFICIENCY is achieved through carefully planned layout. Materials and products move crosswise of plant, by most direct routes—from receiving to storage, processing, packaging, and shipping. Packaging lines are in parallel, with related processing operations immediately behind them in separate room. Bags are made in area adjacent to packaging room. Cases feed from out-of-way balcony to ends of packaging lines. Pallets of finished goods, on roller conveyors, supply order belt feeding to trailer-loading conveyor or to city delivery area.

ing room. Finished goods storage and the order-makeup line are between the packaging area and shipping docks.

A feature of the plant layout is that pork skin storage, processing, and packaging are part of building, yet are isolated to meet government regulations.

BETTER HANDLING EFFECTS GREAT ECONOMY

Biggest operating economy achieved in the new plant comes from improved materials handling, particularly in moving the "mountains" of potatoes every day. Formerly, the individual bags had to be re-handled several times.

Here, then, was an ideal spot to employ fork-lift trucks to move the bags in multiple units. So after thorough study of the available equipment, Lay invested in five Lewis-Shepard electric-powered fork-lift trucks.

These trucks save an estimated $20,000 a year over the hand-and-jack trucks formerly used.

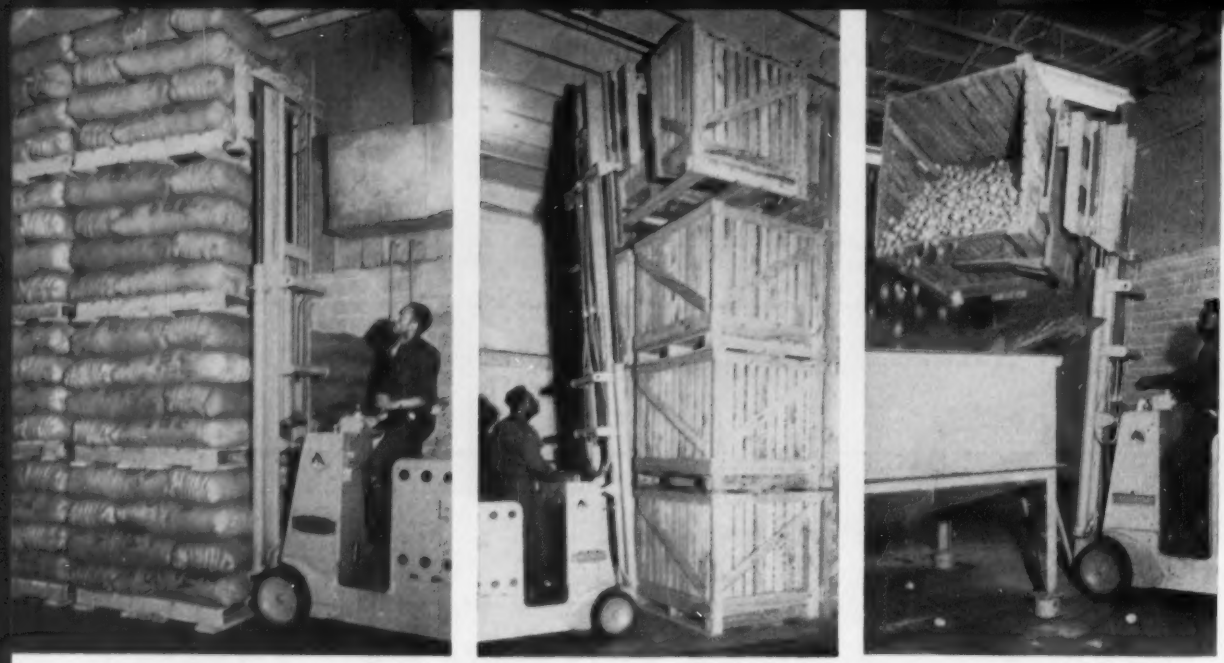
Normally, potatoes come by the carload, in 100-lb. burlap bags. The bags are dumped into wooden pallet boxes, 20 sacks to a box. The boxes are then picked up by the fork-lift trucks and moved into storage rooms.

Measuring 48x51½x48 in., the boxes were designed specifically for Lay. They are built of oak, incorporating a 4x4-ft. pallet as the bottom to accommodate the forks of the truck.

This type of bulk handling also permits full use of storage areas. A 3,000-lb. capacity truck with a lifting height of 150 in. handles this operation. It stacks the 2,000-lb. loads up to the ceiling, four high. This reduces space needed from 63,500 to 42,000 sq. ft. With floor space worth roughly $7 per sq. ft., the estimated saving is another $140,000.

The open-work oak boxes are excellent from another point of view. They allow passage of conditioned air over the potatoes. And the potatoes also can "breathe," reducing shrinkage.

When potatoes are needed for processing, a crate is picked up by a spe-



BIG SAVINGS have been achieved by mechanized handling. Electric lift trucks were specially equipped for work. These handle incoming bagged potatoes, stack the 1-ton boxes into which potatoes are emptied from bags, then transport boxes and dump them into vat at start of chip line.

cial fork truck with a 180-deg. rotating head, transported, and dumped into a 2,400-lb. hopper at the head of the chip line. A side arm bolted to the revolving head holds the box in place during dumping, and this can be removed quickly if the fork-lift truck is needed for other jobs. This truck has a capacity of 2,750 lb. at 24-in. load center. Its lifting height is 150 in.

Electric fork-lift trucks are also used in handling merchandise from packaging to shipping departments. Cartons of chips are placed on plywood pallets supported on a stand so that the truck forks can reach under the load. The truck moves the load to the finished goods storage and deposits the pallet on one of a series of special gravity roller conveyors, alongside the shipping order make-up belt. As cartons and pallets are removed from the conveyor at the shipping belt, another pallet load moves forward by gravity to be within easy reach.

For this phase of the handling operation, two 2,000-lb. capacity electric trucks with a 127-in. lift are used.

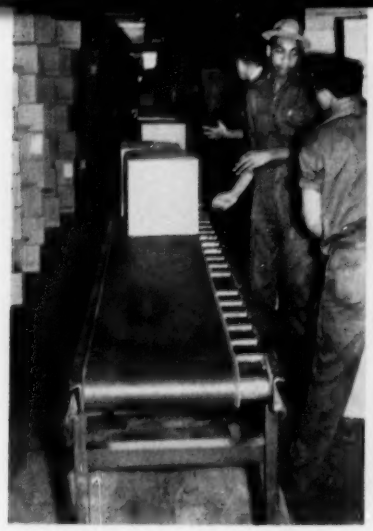
In an average day, each of the trucks used in raw storage and processing areas handles approximately 160,000 lb. This work load previously required twice the number of men now engaged in these operations.

The fork-lifts handling finished merchandise have a much lighter work load—about 20,000 lb. per shift. A 1,000-lb. capacity truck would be adequate for the job, but trucks of twice that capacity were selected to also handle packaging material and other heavier loads that must be moved from time to time.

Lay bought electric trucks to avoid gasoline fumes in the plant. The trucks are compact, and can get in and out of tight spaces without loss of time. Also, the "Stand-Rest" feature makes for safe operation, especially in reverse.

In moving into the new plant, the trucks paid an unforeseen dividend. They handled approximately 70% of the machinery moved, at one time or another. This saved much in both time and money.

QUICK MOVEMENT of finished goods to keep packaging room uncluttered is effected by lift trucks. These pick up cases on pallet-board from supporting pipe rack, carry load to finished goods department, and place it on inclined roller conveyor set at angle to order-makeup belt.



SHIPPING orders are speedily made up by taking cases from pallets on roller conveyors. When one pallet-board is empty, full one behind it rolls forward. Makeup belt, extending length of shipping department, conveys cases to overhead conveyor on loading dock, where they are deflected down portable chute to telescoping conveyor extending into trailer. Two men can load 1,300 cases in 30 min. One end of portable chute rolls on rail alongside belt, and other is supported by trolley hoist.

Just as lift trucks were carefully selected for the unit-load handling jobs, so also were different types of conveyors and hoists picked for other operations.

A 210-ft., 20-in. belt conveyor runs the length of the finished goods department, between the rows of pallet loads of cased products on the live roller conveyors. Order makeup men quickly pick cases from the pallet loads and drop them onto this belt. The cartons are conveyed to a 50-ft. overhead belt on the loading dock wall, and are deflected onto a chute extending at a right angle to a portable, extendable, truck loading conveyor. With this setup, four men can load 1,300 cases into a trailer in 30 min.

The high end of this chute rolls on rails along the overhead belt conveyor, while the low end is supported by a chain hoist hung from a trolley on an overhead rail.

Here are still other examples of handling that is tailored to the purpose: Hoists lift caster-equipped "hoppers" of nuts into position over roaster inlets, the nuts discharging through a bottom opening with a slide gate. Lay believes this type of handling results in fewer splits. The hoists are on a tramrail for horizontal movement.

Hoists also pick up 300-lb. dolly-mounted containers that have been filled with pieces of pork skin at the cutter, and dump the skins into elevated steam-jacketed cookers, saving time and back-breaking labor.

Continuous free-swinging bucket type Robo-Lift conveyors gently elevate nuts to near ceiling height and carry them horizontally into packaging machine hoppers.

NEW PROCESS METHODS

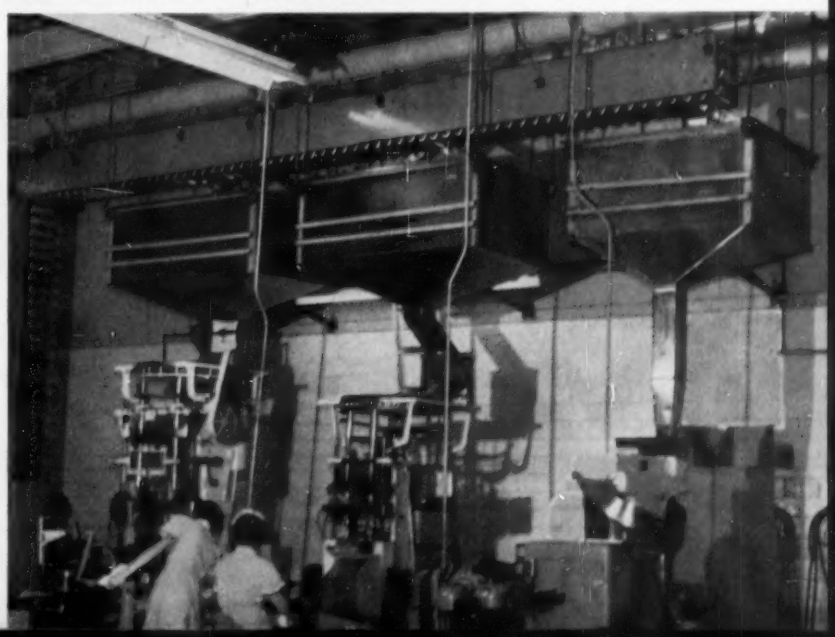
There are major processing advances in the Lay factory. One is the heating of fryer oil in a heat exchanger, using Aroclor as the heat-exchange medium. This liquid medium is heated in a remote-gas fired heater, and temperature is automatically controlled to close tolerances. Big advantage of this system is that the oil is not overheated, chip quality is better, and fuel consumption is reduced.

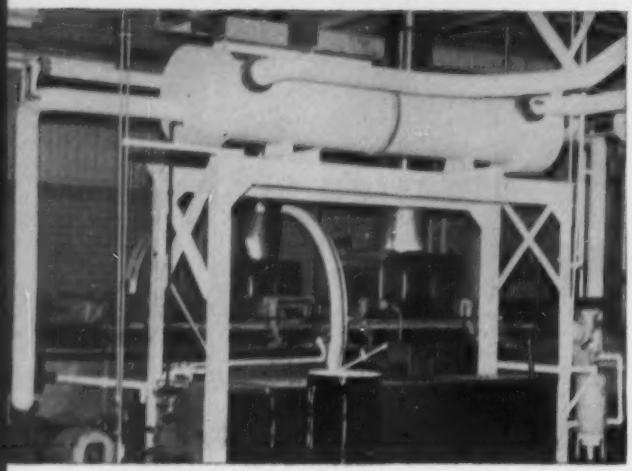
Another outstanding innovation is the pork skin cooking operation. Pieces cut from the skins by high-speed rotary knives are cooked in 600-lb. capacity, steam-jacketed agitator kettles instead of gas-heated vats. After cooking, the skins are flushed out the bottom of the steam kettles through an 8-in. plug valve.

The batch dumps onto a wire-mesh conveyor that drains off the oil for reuse and carries the skins to a surge-bin for bucket elevation into a puffer, or deep-fat fryer. This continuous fryer is only 6 ft. long, 2½ ft. wide and 8 in. deep, and the skins move through its 400F. gas-heated oil in 15 to 30 sec. This "explodes" the skins to produce the popular Bakon Puff tidbits.

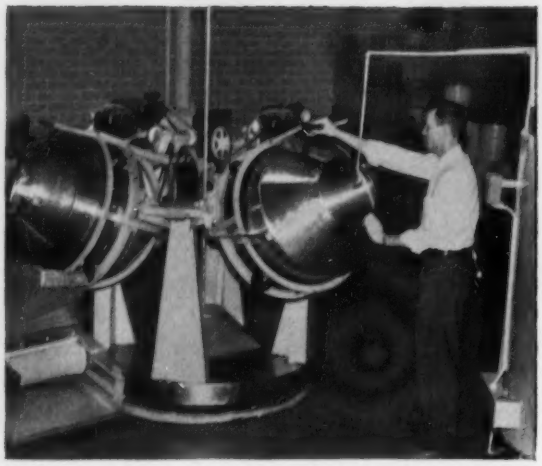
Clever adaptation of a Sutton Steele

CONVEYORS move products from process to packaging. Here stainless steel Robo-Lift bucket conveyor elevates nuts and carries them horizontally to three packaging machine hoppers. Belt conveyors feed chips to batteries of packaging machines, where cross-conveyors, with flights, plow chips off main belt into hoppers. Hoppers have level control.





REMOTE HEATING of oil in one of two chip fryers is achieved with heat exchanger (foreground) and liquid which is heated in gas-fired furnace.



QUICK SPRAYING of liquid cheese flavoring on Cornetts is done simply by turning tumbler in front of nozzle, then starting timer-controlled pump on heated tank (right).

& Steel specific gravity grader is used to separate poor quality Bakon Puffs from the good.

There are several advantages in steam-kettle cooking. The process takes less floor space than a large deep-fat vat, it saves on cost since the steam is efficiently produced in a central boiler, and it reduces the exposure of product to high-temperature oil to a fraction of a minute. The latter advantage gives better process control. At the same time, much less oil is exposed to the damaging high temperature.

Labor is saved, too, and a neater operation obtained. By the old method, the cooked skins had to be hand-dipped from the direct-fired cooking vats.

Other process innovations, of less magnitude but still important, have been introduced. One is a method for spraying a cheese-oil mixture on Cornetts (a roasted extruded-corn product), as well as butter on popcorn.

Four tumblers in which Cornetts are mixed with the cheese flavoring are mounted on a turntable. After the product has been poured in, the turntable is swung around until a tumbler mouth is adjacent to a spray nozzle connected by pipe to an electrically heated tank containing the cheese-oil mixture. Then the operator steps on a foot switch which starts a pump at the tank to deliver a spray of the flavoring onto the corn. A timer stops the pump when the correct quantity has been sprayed.

To take care of increased sales, Lay has provided space for installation of additional processing units without shifting existing lines. Even the service piping and conduits have been installed, ready to use.

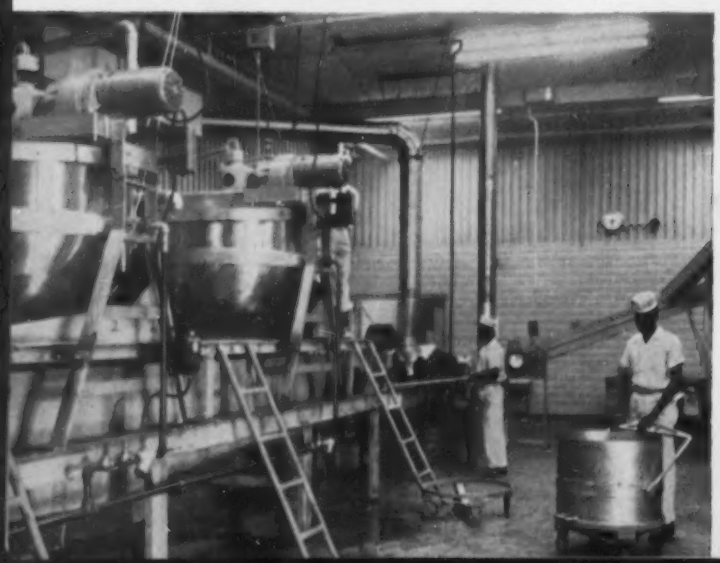
INNOVATIONS AID PACKAGING OPERATIONS

Packaging being a major operation with Lay, much attention is devoted to improving containers, machines, and methods.

The firm uses over 3,000,000 double-wall cellophane bags each week in its Atlanta and other plants. So it finds it advantageous to make most of its own bags on a battery of machines located near the packaging department at one end of the finished-goods storage area. All told, 10 Simplexes and 1 Rota-Bag unit are used in the bag-making operation.

To keep the moisture content right during shipment to branches or in storage, the bags are packed in polyethylene-lined cartons. If the cello-

LAY'S NEW PROCESS for cooking pork skins. From preliminary cook in steam-packet agitator kettles, they go by mesh belt to continuous fryer. Saves labor, fuel. Improves quality.



QUALITY GRADING of Bakon Puffs is unique application of specific gravity separator originally developed for non-food products.

PACKAGING department extends almost full length of plant, with machines in parallel. Here chips are being weighed, filled into moisture-proof double cellophane bags, continuously heat-sealed, then cased on pack-off conveyors (right). Belt conveyor at upper left feeds machines. Balcony at upper right keeps cases out of way until needed. High-level illumination is by fluorescents in reflectors that direct 10% of light to ceiling to soften contrast. Air is conditioned.

phane gains moisture, it is difficult to heat-seal after filling. If it loses moisture, a brittle seal results, and it is likely to break.

For efficiency in packing the bags, Lay devised a rotating 48-in. accumulator and pack-off table that turns at about 2 rpm. The bag machine lays the containers neatly in a 50% overlap pattern around the circumference of this table as it turns. And the pack-off girl can, with a sweep of the hand, scoop up a stack of the bags and put them into a carton, because the bags semi-stack themselves against an inclined metal stop.

Another innovation is a volumetric filler for Bakon Puffs, built by the Woodman Co. to Lay's design. A series of product-measuring cylinders are mounted in a rotating circular plate, their bottom openings being closed by a stationary plate under them. As these cylinders travel, they come to an oval-shaped opening in the fixed plate that discharges into an oval-shaped tube. At that moment, a filling spout on a lower rotating plate moves under the tube, and an attached bag receives the product, the bag being blown open by a cam-activated air jet.

The volumetric cylinders are filled with product discharged by conveyor onto the machine's top, or receiving, plate. And a rotating nylon brush, with bristles set into a neoprene base (to permit overnight soaking), moves the product into the cylinders as the plate revolves.

This top plate has sleeves which telescope inside the measuring cylinders, permitting volume of fill to be adjusted. The plate is suspended from a block which can quickly be screwed up or down on the driving shaft, even while the machine is operating, to adjust the fill.

Big advantage of the oval-shaped tube between measuring cylinders and bag filling spouts is that it lengthens the time the volumetric cylinder is over the opening (as compared to a circular opening), facilitating discharge of product to the bags and

THEY DID THE JOB

Before this outstanding new food plant could become a concrete thing, it had to take shape in the minds of men, in all its details. It is a creative work, not a copy.

The men with the minds make up quite a long list. Top management took the forward look that conceived such a facility.

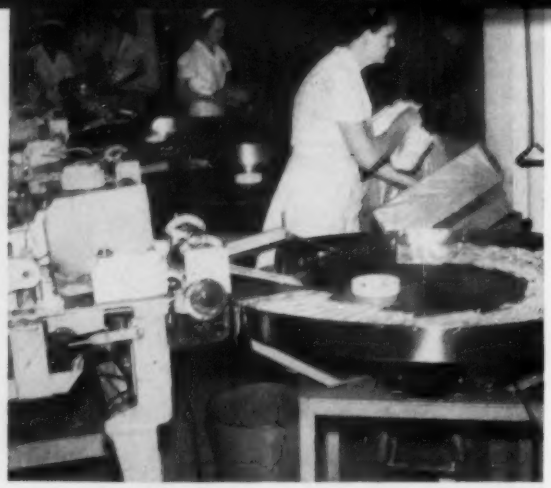
Involved were Herman W. Lay, president; William B. Oliver, executive vice-president; George Williamson, secretary and treasurer; Robert E. Dunn, vice-president of purchasing; and William E. Freeman, vice-president of manufacturing, the man who was chief engineer during the planning, designing, and equipping of the project.

Lay's engineering department played a major role. Mr. Freeman was assisted by engineers H. R. Cole and H. C. Waggoner. The company's chief chemist, Barney W. Hilton, was the expert on food technology, and Arthur Goldstein, potato horticulturist, advised on potato storage.

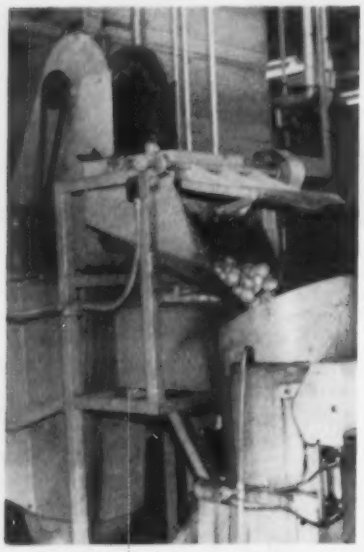
Ideas and engineering talent were brought in from the outside, too. Douglas McBean, Rochester, N. Y., served as consulting engineer. Horace Smith, Jr., Richmond, Va., engineered the advanced Smitherm chip frying process. And Orkin Institute, Atlanta, were consultants on sanitation.

Architects and engineers for the building and service facilities were Locatell, Inc., Atlanta, who used the services of professional engineers Thomas Earl Blakely and A. O. White, Jr.

BETTER MACHINE for packaging Bakon Puffs is Lay development. Volume of fill can be adjusted by screw on central shaft while machine runs. Oval-shaped transfer tube between measuring cylinders and bag spouts permits speeds to 85 a min.



2½ MILLION BAGS a week are made on battery of machines. Each machine deposits bags on Lay-designed turntable for fast pickup. Girl packs bags in polyethylene-lined case to keep moisture content right for best performance in retaining product quality.



LATEST in chip equipment is automatic control of peeler feed. Batches of 50 lb. are dumped from potato weigh-hopper at timed intervals. Air cylinders open and close hopper and peeler gates in proper sequence.

speeding machine capacity to 75-85 bags a minute.

With the aid of a practical device, one operator can slip empty bags on the spouts with the machine going at a fast clip. Two stacks of empties are held on a stainless steel tray shaped to fit the operator's lap. With an upward sweep of the hand she can catch a bag by the top and slip it over a spout. Both hands are used, in alternation, one working from one stack of bags, one from the other.

And Lay is experimenting with machine tying of cases, instead of closing them with glued tape. Idea is to permit reuse of the cases without expending labor to strip off the old tape, and to get a greater number of "trips" out of the containers by virtue of less damage in opening and stripping.

High packaging-department efficiency is achieved through an ideal layout of packing machines and the methods for getting products and supplies to the machines and then taking away the finished cased products. The department occupies a space 330 ft. long and 45 ft. wide, with no columns or other obstructions. The machines are placed in parallel, crosswise of the space, and about 8½ ft. apart for plenty of elbow room. And space is provided for additional machines.

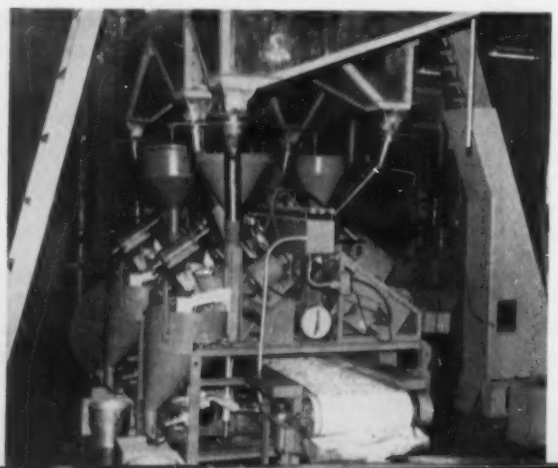
INTRODUCES AUTOMATION

Lay leaves no stone unturned in its search for practical mechanization and automation. And in the new plant you find an electronic sorter for blanched nuts. Each nut is picked up by a vacuum "finger" on a rotating disk that carries it past an electric eye. And nuts that are off color, or have a bit of skin adhering, trigger a fast-acting pneumatic ejector through the photocell and its associated relays.

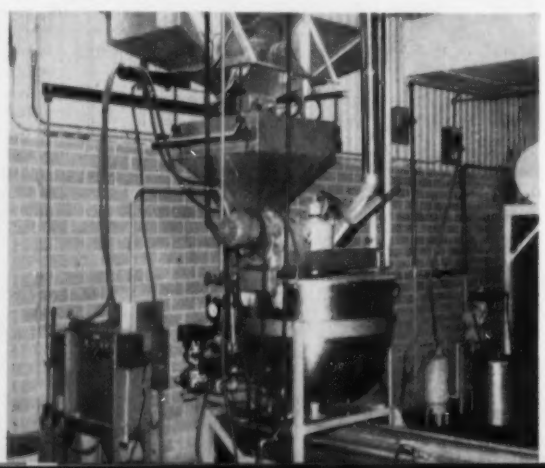
With four inspecting units, this machine scans 600 lb. of peanuts an hour. Rejected nuts are passed through a second time to make certain that no sound ones got into the discard.

Automatic batching is employed in Fritos processing. White and yellow

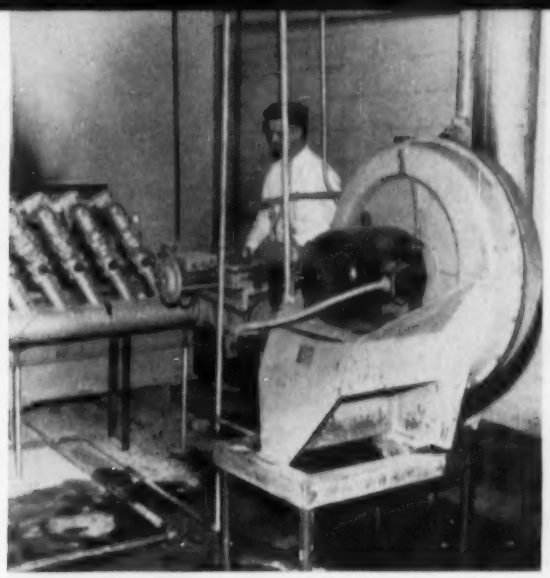
ELECTRONIC SORTER views 600 lb. of nuts an hour with four heads. Vacuum fingers on rotating wheel pick up nuts, carry them past a photocell scanner. Dark spots on nuts trigger fast air-actuated rejector.



AUTOMATIC BATCHING saves time in Fritos production. Two kinds of corn are weigh-hopper proportioned into cooking kettle. Water is flow-metered into batch. Control is by pushbutton.



DRY WASTE is readily disposed of by burning in handy incinerator. Ashes are removed into truck that parks on inclined ramp.



ODOR CONTROL is achieved by burning fume-laden air from pork-skin cooking—in furnace that heats fryer oil heat-exchange medium, or in steam boiler firebox.

shelled corn, grown in Texas and Kansas, is separately contained in a two-section supply hopper above a weigh scale that serves the steam-jacketed cooker. At the push of a button on the control panel, an air-operated gate opens and a preset quantity of yellow corn flows into the weigh hopper.

Then the gate is pneumatically shifted to discharge the correct weight of white corn into the hopper. The operator then dumps the batch into the kettle by pneumatic control. Now a preset quantity of water is metered into the kettle. And after the cook is completed, the operator dumps the 500-gal. batch from a wide opening in the kettle bottom by pulling a lever that lifts a plug valve via a rod through the hollow agitator shaft.

Rate of flow of potatoes to the chip line is automatically controlled to steady the washer and fryer load and help hold oil temperature and chip quality steady. Potatoes are elevated from the dump bin into a weigh hop-

For information on suppliers, see page 145.

per that automatically stops the elevator at 50 lb. Then the batch is automatically dumped into the peeler by a solenoid-operated air cylinder that opens a gate.

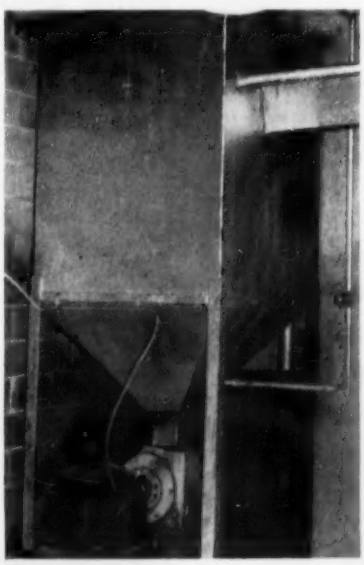
Time-delay controls determine how long the batch stays in the abrasive peeler, it also being emptied by an air-operated gate actuated by a solenoid. And, of course, weigh hopper and peeler gates are synchronized so that the former does not open until the latter has emptied the peeler and closed. Adjustment of the time cycle from zero to 120 sec. is easily made by shifting settings in control boxes.

An outstanding temperature control installation regulates temperature in the Smitherm frying oil heater (see FE Mar. '55, p. 60).

QUICK WASTE DISPOSAL

Lay's engineers came up with efficient ways to dispose of refuse. Wet waste, mostly potato peels, is chuted to a 5-hp. Chain-Belt grinder in the basement. A 1-in. pipe discharges water into this grinder, so that comminuted waste is fluidized for discharge into the municipal sewer.

Dry waste is incinerated, except that taken away free by collectors.



WET WASTE, mostly peels, is ground in basement unit, flushed with water, and discharged to municipal sewer.

Located at the receiving platform back of the plant, the incinerator is equipped with a concrete bin into which waste is dumped. Ashes are removed from the incinerator into the bed of a truck parked on a ramp at a lower level. For complete combustion to avoid smoking up the neighborhood, the unit has an afterburner.

BURNS COOKING ODOR

To destroy the odor and smoke produced in cooking pork skins—for employee comfort and community pleasure—the fumes are burned. Ventilating hoods over the cooker and the fryer-puffer exhaust through ducts to either the steam boiler or the potato chip oil heating furnace, the selection being under damper control. All air in the room is thus exhausted.

NEW STORAGE IDEAS

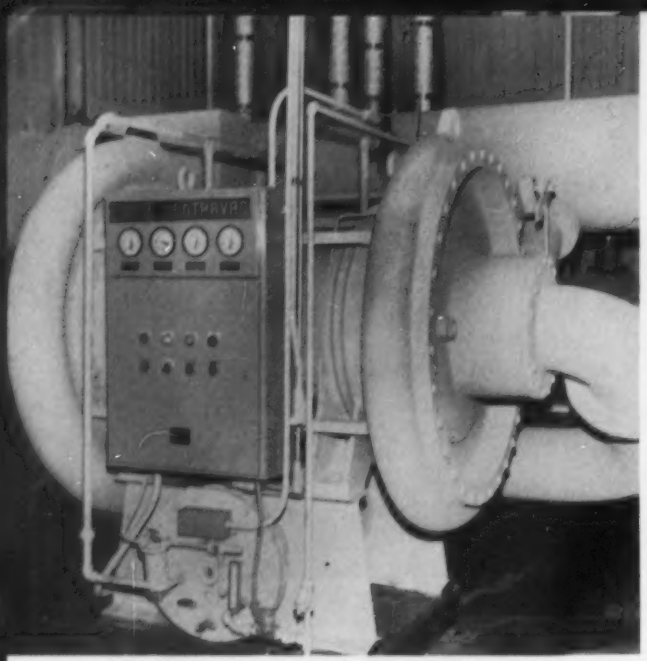
Still another ingenious innovation is a system for circulating conditioned air through boxes of potatoes.

Sunken air-flow troughs are built into the concrete floor of each storage room, full length of the room, and near each side wall. And a board with spaced openings covers the trough.

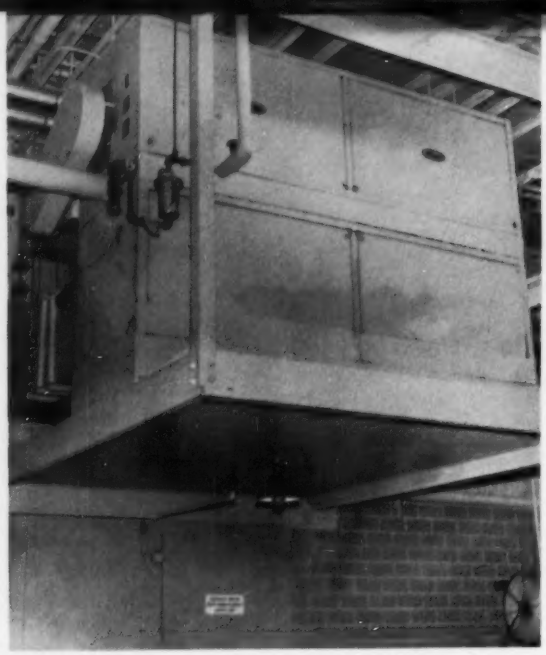
Metal ducts connect the center of each trough to the intake side of the conditioning unit. So air is pulled from the floor level, conditioned, and discharged through a ceiling duct and diffuser outlets extending the length of the room.

This system sets up an air flow from top center of the room downward and outward, through crates, to the troughs.

Temperatures in the three rooms are individually controlled at any de-



EFFICIENCY in refrigeration for air conditioning is achieved over wide load range by centrifugal Freon compressor with automatic capacity modulation.



OUT-OF-WAY air conditioner is mounted on platform suspended from ceiling. Such units are extensively used for storage, packaging, cafeteria, and office areas.

sired point between 55 and 70 deg., winter or summer.

Cooking oils are stored in three rectangular steel tanks that are heated by hot-water coils in their concrete foundations. Each tank has a small, partitioned-off section into which oil is pumped from the main compartment, when it is about empty. Then the tank can be cleaned.

ADVANCED REFRIGERATION

Lay engineers went for the advanced in refrigeration, too. They installed a 234-ton centrifugal Trane compressor which not only stops and starts automatically, but has capacity modulation from 100 to 10% of full load with high efficiency under widely varying loads. Using Freon 22, this compressor chills water for the air conditioning units. It delivers 430 gpm. of 40F. water and uses 670 gpm. of 85F. condenser water.

AIR CONDITIONING

For better processing, packaging, and storage conditions, plus employee comfort and efficiency, a large part of the Lay building is air-conditioned by Carrier Weathermaker units. Some of these serve individual rooms, like potato storage, and others take care of more than one area. All piping and ductwork in office areas are concealed above the ceiling.

High-volume ventilation is provided in non-air-conditioned plant areas. Six powerful fans with adjustable, directional, duct-type outlets create breezes in warm processing areas. Then there are five 48-in. exhaust fans in the roof.

ARCHITECTURAL EFFECTS

Modern building materials are selectively used throughout this new plant. Some give striking architectural effects. Others make interior walls more sanitary and more resistant to the ravages of water and food acids. Still others save construction time, reduce wall masses, and curtail maintenance.

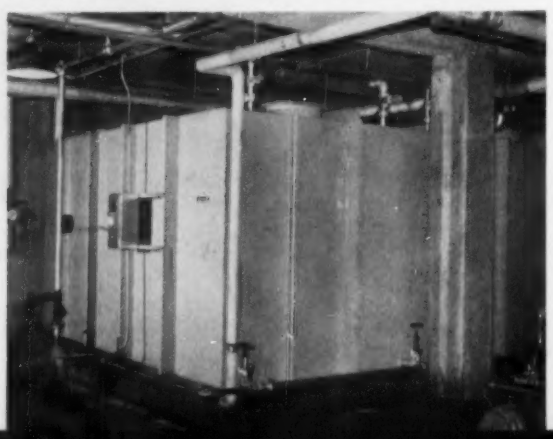
Stippled-finish, cream-colored, porcelain enameled steel panels add an ornate touch to the exterior finish of the two-story front section of the building, and are in colorful contrast to the red brick facing.

Long, horizontal, louver-like, enameled metal strips in front of executive office windows give a modern touch, and at the same time deflect sun glare. Large window areas with aluminum trim are attractive as well as practical.

Even the walls of the one-story factory section are unusual. Above the brick-faced concrete-block lower half of the walls is maroon-colored Galbestos siding, of the 24-gage V-Beam design, with 1½ in. of insulation and an 18-gage back. (*Turn to page 144*)

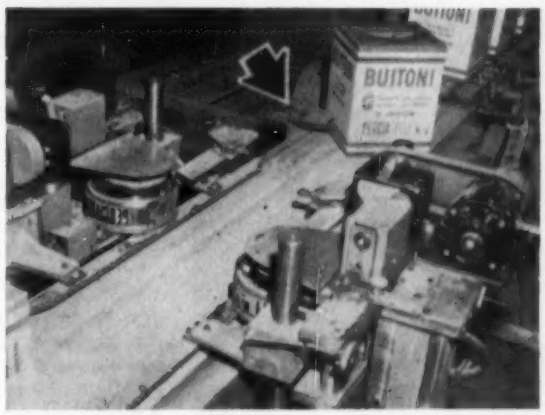
INNOVATION in potato storage is circulation of conditioned air from central overhead duct, downward and outward through boxes of potatoes, to air troughs in floor near side walls.

WARM FOUNDATION under oil tank is heated by hot-water coils in concrete. Tank has compartment into which oil from nearly empty main section is pumped to permit cleaning tank.



2-Step Case Printing Cuts Multi-Item Cost

Vari-size containers are delivered partially printed, then package-line units put on final product names and numbers. Thus, inventory control is simplified, case handling minimized, and storage space saved



ALL FOUR SIDES of cases are marked by roller-type coding attachments. Top: On way to case sealer, filled case approaches first twin unit that imprints two sides. Above: Emerging from sealer's compression section, case is rotated 90 deg. by turner (arrow), then goes to second unit that marks other two sides.

LEONARD TRAUBERMAN
Assistant Editor, "Food Engineering"

TO MAINTAIN large inventories of shipping cases—preprinted for each of 41 macaroni products and 17 other processed foods—had proved a cumbersome and costly operation for Buitoni Food Corp., S. Hackensack, N. J.

Although many of the units were identical except for product identification, for all practical purposes there were 58 different cases to be handled.

Specifically, this led to a three-fold problem—

1. **Inventory control:** Regardless of rate of product turnover, cases for each item had be bought in large numbers to get a quantity price. Aside from money tied up in inventory, keeping track of so many different lots entailed considerable clerical work. And there was always the possibility of stock loss through products being discontinued.

2. **Warehousing:** Utilization of space was inefficient because of the need to keep each lot separate.

3. **In-plant handling:** Labor charges were excessive, since supply of cases had to be synchronized with the particular products run at a given time.

However, this situation was quickly remedied when Buitoni switched to partially printed cases (product identification omitted), and installed automatic imprinting equipment on its four packaging and case-sealing lines.

Now, product markings are applied on all four sides of the case, which permits easy identification from any angle in jobbers' warehouses or grocery stores. And with one case serving for several items, the new system . . .

- **Cuts the number of case lots from 58 to 10, and without affecting the quantity price.**
- **Eliminates stock loss through obsolescence.**
- **Permits consolidation of cases to save storage space.**
- **Minimizes special handling.**

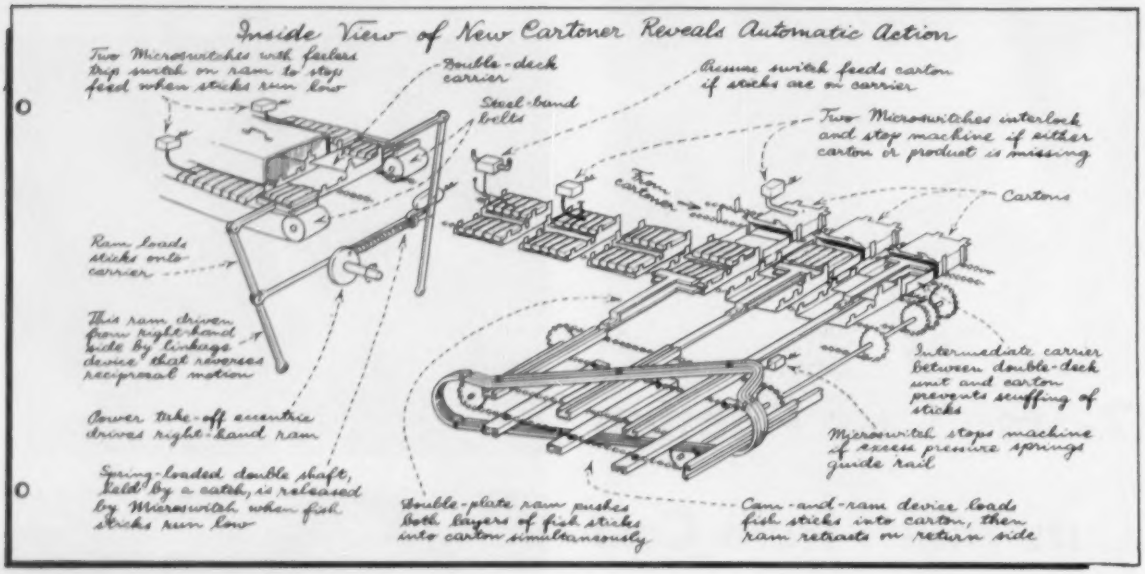
The typical setup for marking cases on four sides employs two imprinting units (Model 750 Rolaprinter, Adolph Gottscho, Inc., Hillside 5, N. J.) and a case-turning device. Each unit, in turn, contains two printing heads that imprint changeable legends.

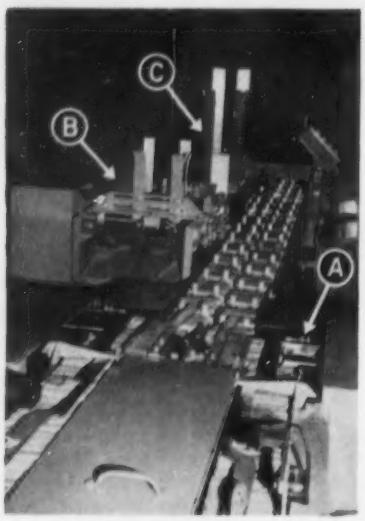
System in Action

The first unit is installed on the conveyor leading to the case sealer, while the other is at the end of its compression section.

In operation, filled cases are imprinted on two sides with appropriate variety name and number as they go to the case sealer. Emerging from the compression section, they are turned 90 deg. on a straight-through pass, then marked on the other two sides.

Imprinting attachments incorporate a vertical, motor-driven flexographic system that synchronizes with speed of cases. An electro-mechanism controls positioning of imprints, even with irregular case flow. And rubber type or dies used are readily changed.


Inside View of New Cartoner Reveals Automatic Action
Two Microswitches with feelers trip switch on ram to stop feed when sticks run low
Double-deck carrier
Steel-band belts
Pressure switch feeds carton if sticks are in carrier
Two Microswitches interlock and stop machine if either carton or product is missing
From cartoner
Cartons
Ram loads sticks onto carrier
This ram driven from right-hand side by linkage device that reverses reciprocal motion
Power take-off eccentric drives right-hand ram
Intermediate carrier between double-deck unit and carton prevents scuffing of sticks
Microswitch stops machine if excess pressure springs guide rail
Spring-loaded double shaft, held by a catch, is released by Microswitch when fish sticks run low
Double-plate ram pushes both layers of fish sticks into carton simultaneously
Cam-and-ram device loads fish sticks into carton, then ram retracts on return side



IN FULL ACTION, fish sticks are slid into carrier by ram, as at (A). Inserter (B) puts folder in cartons (C).

Fish Sticks Sped by

JOHN M. KOHR
Plant Engineer, Gorton's of Gloucester, Inc., Gloucester, Mass.

MANY NEW FOODS go through an initial rapid boom in popularity—then stabilize as the original novelty wears off.

From this point on, a company's progress depends entirely on its ability to produce a top-flight product at low cost.

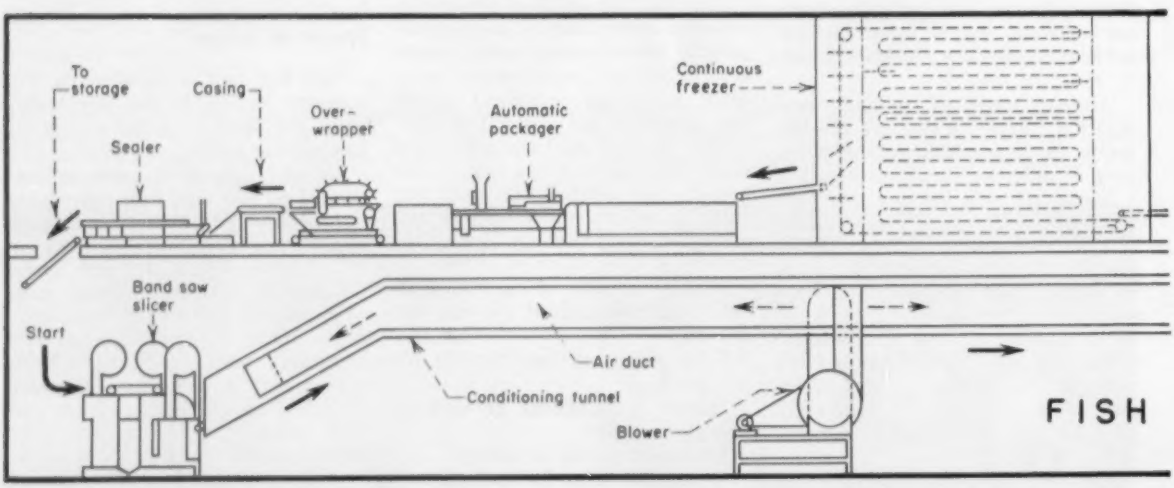
Frozen seafoods have followed this familiar pattern. And we at Gorton's have tried to seize the initiative by constructing a new seafood center (FE July, p. 66), where every possible automatic means is employed to reduce hand labor and maintain highest product quality.

Our frozen fish stick line is a good example of this automation. To build it, there were four major problems to consider and solve:

1. Tremendous amounts of waste sawdust are created by sawing sticks from frozen blocks of fillets. Yet, 0-deg. blocks are too cold to cut otherwise.

2. Until they are frozen, fish sticks are particularly fragile, thus must be handled with care to prevent excess breakage.

3. After frying, moisture in the



- Waste-saving cutters
- Novel non-stop Freezer
- Automatic cartoner

—are innovations which cut labor and up quality on this 2,500-lb./hr. line

'Hot' Units

sticks tends to migrate to coating. The fish sticks shrink and their coatings wrinkle, producing a poor appearance.

4. Previously, fishsticks were all handpacked. But we wanted to mechanize this operation.

In a point-by-point rundown on this newly opened line, here's how we solved these problems with three equipment innovations:

Sawing Waste Reduced

The raw product consists of frozen fish blocks that measure 20x11⅜x1½ **in. We first designed** a conveyor system that moves these slabs through two parallel band saws (Bird). These divide each block into three parts that scale 20x3¾x1½ in. Slabs then fall on a second carrier that moves them through a third band saw where blocks are cut into two portions, measuring 20x3¾x¾ in.

No more sawing is done. Instead slabs travel to reciprocating cutters by way of a special long tempering tunnel, which we designed and built.

Here, room temperature air, blasting over raw product at the rate of 57,000 cfm., raises blocks from 0F. to 15F. in 4 min. Blower suction is located in center of the conditioner. Discharge is into a duct running parallel with the product tunnel. And air enters the main tunnel at both ends. Thus, air current flows with the product during the first half of the trip, against it during the last half.

When temperature drops below the desired 55F., a thermo-controlled damper exhausts chilled air outside the plant and replaces it with more at room temperature.

At the end of the tunnel slabs are soft enough to be cut in the two reciprocating machines (Weber). Sticks are continuously sliced from the standing blocks at the rate of 480 per min. per machine.

Fish sticks drop on a conveyor under the cutters, and after inspection, pass up to the main processing floor by a stainless steel bucket elevator.

At this point, women straighten sticks on an aligning table that we designed after seeing similar units in the confectionery field. It is essentially a belt, over which is fastened parallel strips of stainless steel that guide sticks into lengthwise rows.

From here, they pass through a single batter curtain and breader (Greer), where batter-density control is automatic (Wilevco). Next, sticks pass through a shallow-type fryer and cooler—all similar to those on our perchie line.

Cooler Adapted to Freezing

To prevent moisture transfer in the stick after frying, we use a continuous freezer. This quickly chills product, thus "immobilizing" moisture at maximum speed. Obviously, it also cuts labor and quickens product flow.

In searching for a unit that would do the job, yet handle the soft sticks with proper care, we hit on a vertical cooler-conveyor (Greer). And adapted it for the task.

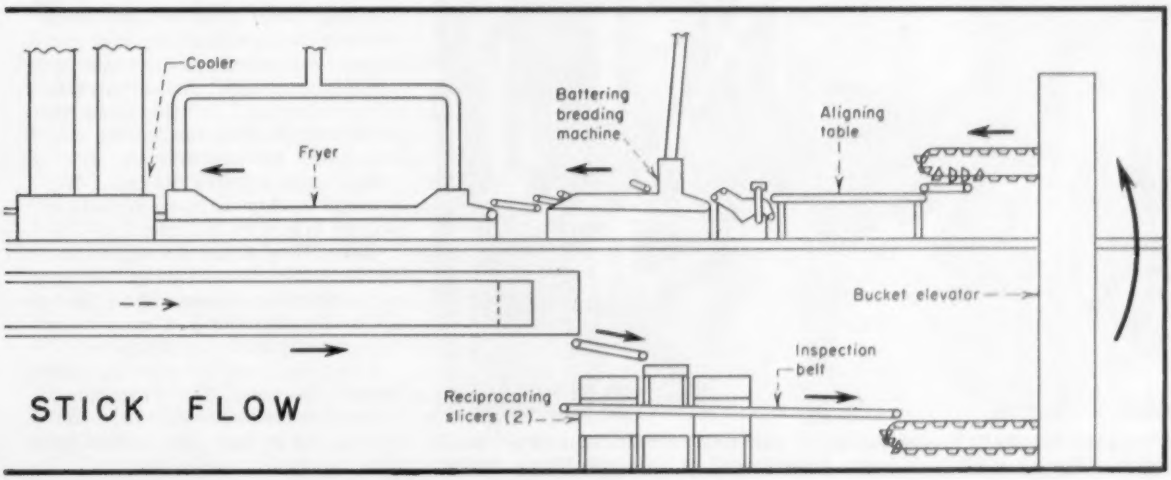
Principle advantage of this device lies in its construction—a series of pivoted trays attached to two chains. Fish sticks are gently transferred from inlet conveyor to trays, and are carried through the 17 freezing levels without agitation.

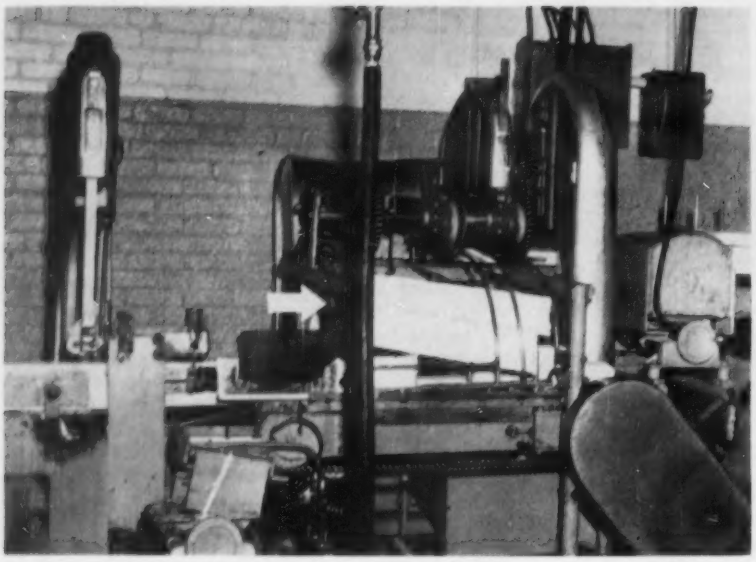
We plan to further improve conveyor-tray transfer soon with a tilting depositor. This will halt movement of sticks momentarily between trays. At present, we are getting a small amount of damage here when tray edges occasionally pinch the product.

Refrigeration Details

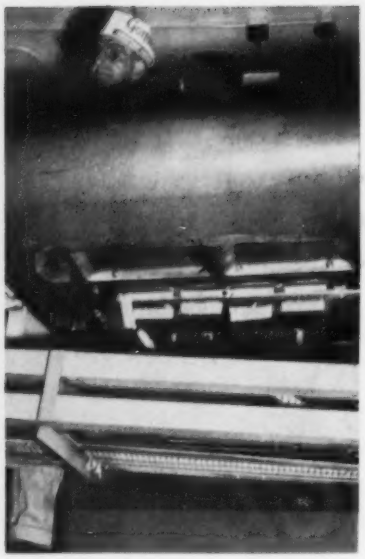
On one side of the tray-conveyor bank are vertical coils, through which the refrigerant flows. Double squirrel-cage blowers (Niagara), mounted on a single shaft, pull air up around the pans containing glycol (No-Frost), and blow it horizontally through the levels. Three of these units provide 55 tons of refrigeration, and maintain freezing temperature of —25F. Unit is designed for a 6-deg. differential between refrigerant and freezer air.

Conveyor and refrigerating equipment are all housed in a single room, sheathed with a most effective insulating material (Alumi-Seal). This highly efficient vapor-and-heat barrier





THREE BAND SAWS give fish blocks first trim. First two blades (right) cut for width. Then slabs slide (arrow) to third saw, which adjusts thickness.



RECIPROCATING CUTTERS slice sticks from partially thawed fish.

comprises many layers of heavy aluminum foil bonded to plastic sheets and spaced with wood furring strips.

In the walls, convection currents between nine layers of this material are eliminated by holding spacing to ¼ in. Ceiling is composed of five layers, held 1¼ in. apart.

All joints in the outside insulating sheets are covered with a pressure-sensitive tape that insures a complete seal.

Prime advantage for us in this type of insulation is the lack of mass. Thus, it "soaks up" less refrigeration when the freezer is started and cuts readying time.

Back to the fishsticks: At the end of the freezing cycle, they cannot be easily damaged. Therefore, trays are merely tilted, and sticks slide onto an exit conveyor that whisks them to the automatic packager.

Mechanized Packaging

Our new cartoning unit was built for us by R. A. Jones Co., Covington, Ky. And we helped them lick some of the designing problems.

The machine, roughly 30-ft. long, automatically gathers sticks into groups of five, opens cartons, inserts a folder, then two rows of fish sticks, and finally closes the interlocking-type package—all at speeds up to 150 cartons per min.

Here's how it works (see diagram):

Sticks enter unit on two 4-in. stainless band belts and are aligned with flat sides (greater dimension) down. One conveyor slants upward until it ends about ¾ in. above the level of the other one. Here, fishticks on both belts hit stops. And when at least 15 have accumulated on the lines, Microswitches trip two rams. These push sticks onto double-deck bucket-carriers that are mounted between the belts on endless roller chains.

As carriers pass down the machine they travel under a feeler. If carriers are loaded, feeler actuates a pneumatic valve that trips cartoner and sets up boxes.

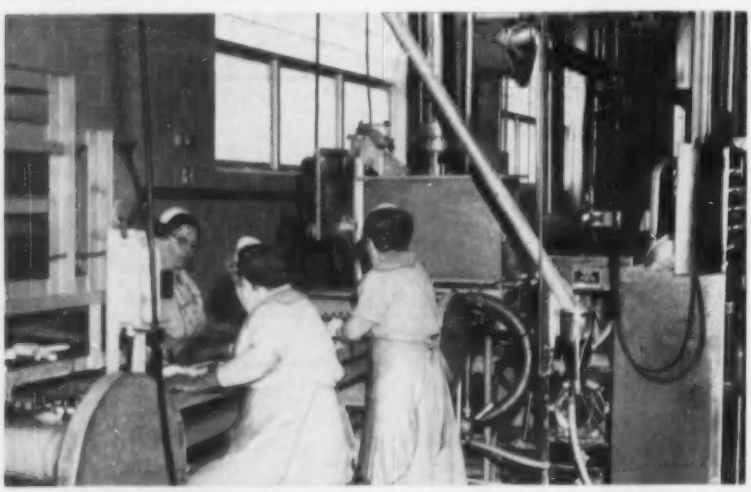
At this point, there are two interlocked Microswitch feelers for added safety. One is positioned over carton line, the other over the sticks. If either product or carton is missing, the interconnected switches stop machine instantly.

Next, a double-plate cam-actuated ram slides both layers of fish sticks smoothly and continuously into the carton. An intermediate trough, located between carrier and carton, aids in this maneuver. It holds sticks together and prevents them from rubbing against the carton.

Here again, a switch is located that stops the machine if excess pressure is brought to bear on the rams.

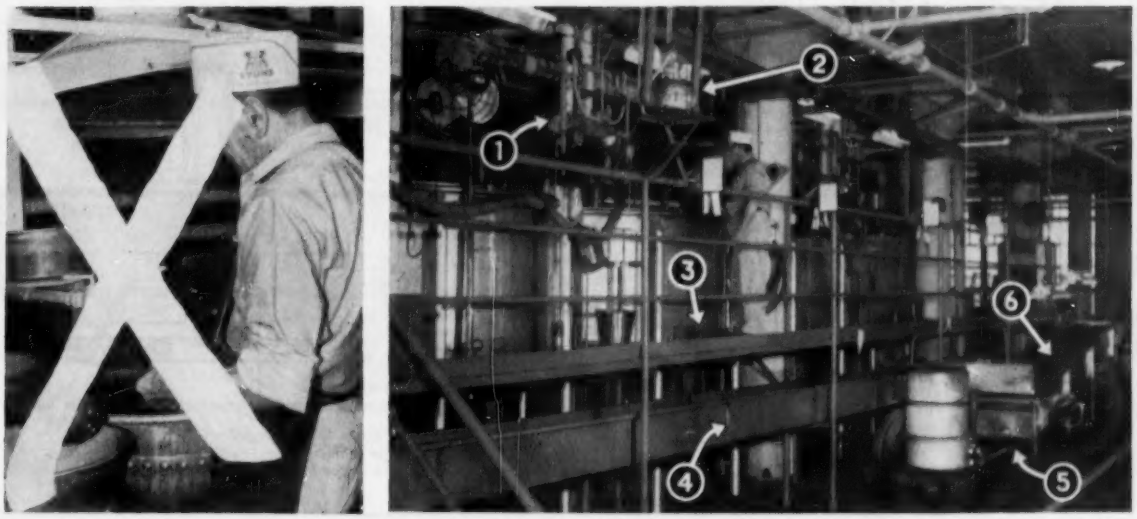
Carton then passes through a closing section. Overwrapping, casing, and case-sealing follows. And product finally slips down a spiral conveyor directly to frozen storage.

Both 1-oz. and 0.8-oz. sticks are run on this line. Our institutional trade takes mainly, the former. Retail sales are in both 1-oz. and 0.8-oz. sizes.



ON ALIGNING TABLE, women inspect and straighten sticks between guide strips. Battering machine (center) is controlled by automatic mixer (right).

Old Method . . . . . Gives Way to New



Gone is traditional tedious operation with small 10-gal. hand-tended kettles (left photo). Supplanting it (right) is high performance system centered in five 1,800-gal. kettles. Indicated are air-water-steam services (1), meter (2), valve (3), that discharges fruit to flume (4), syrup tank and recirculating line (5), drain conveyor (6).

Mass Production Revolutionizes Classic Fruit Process

New maraschino-glace operation saves 80% labor, achieves an annual capacity of over 1,000,000 lb.

E. E. JACOBS and J. H. TRUXELL

Respectively, Vice-President and Chief Chemist, Lyons-Magnus, Inc., San Francisco

MODERNIZATION of our maraschino and glace cherry process has now given us efficient mass production—in place of the old, traditional small-batch, hand-tended kettle operation.

►**This has meant a solid 80% saving in labor and more uniform quality.**

First, the five key points on how it's paid off, here at Lyons-Magnus, Inc., San Francisco:

1. Only one man is now required—and less than 8 hr. a day—to operate our five new processing kettles, as compared with the six-seven cooks formerly needed to make an equal poundage.

2. Today, it takes us less than 2 hr. to unload an 1,800 gal kettle of processed fruit.

3. Costly handling and storage of preserved fruit in barrels has been eliminated.

4. A considerable saving has been realized by abolishing a former by-product—used processing syrup.

5. Operating 8-hr. a day, 5 days a week, we now have an annual production capacity exceeding a million pounds of cherries.

Note, too, that this modernization has been concerned with more than the design and construction of a new process line: It actually includes the fresh-fruit receiving plant, where cherries are preserved in SO_2 brine.

Down to Points

Initial step in this progressive move was to do away with the old batch brining in 52-gal. wooden barrels (*Food Industries*, Nov. '50, p. 81) and supplant it with our new mass method using large wooden tanks.

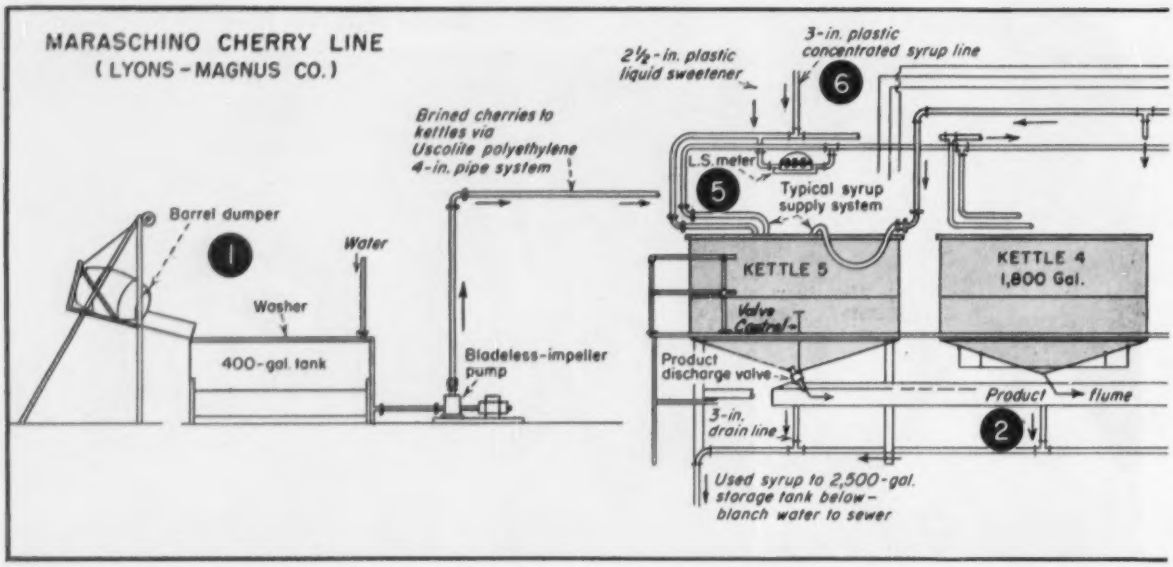
Cherries are now brined at a new tank-farm at Sebastopol, Calif., the heart of California's cherry orchards. Fourteen tanks (13,000 gal. each) are now located adjacent to the cherry stemming and pitting plant.

Here, during harvest, growers deliver fruit in field lugs, which are accumulated in easy-to-handle pallet loads. These are raised to tank platforms by lift-trucks, then moved by hand pallet-trucks to the tank being filled.

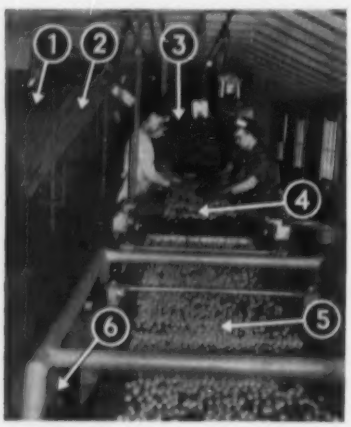
The tanks are partially filled with brine to cushion the fruit when it is dumped. Tank covers, removable in four sections, serve to protect the product.

Cherries and brine are recirculated in these tanks to assure perfect brining. Fruit damage is avoided by using a bladeless-impeller pump for recirculating. Brine and fruit reach equilibrium in 4-6 weeks, and the fruit is then ready for stemming and pitting.

Because of the corrosiveness of SO_2 brine, the piping system leading

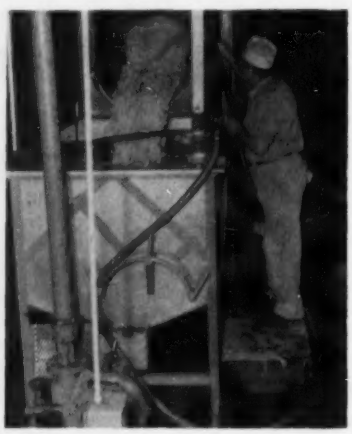


FLOW DIAGRAM TELLS INSIDE STORY. After washing (1), cherries are pumped to any one of five kettles via demountable plastic tube. When process is complete, fruit is discharged into product flume (2) and flows to draining conveyor (3) to be trayed. Syrup is recirculated (4) to kettle being emptied to provide liquid cushion and a medium for fluming fruit to conveyor. Fresh liquid sweetener is metered (5) and re-concentrated syrup (6) is



CHERRIES are initially pumped from tank (1) over the brine separator. Then they're elevated (2) to stemmer (3), inspected (4), size-graded (5), and chuted (6) . . .

. . . **TO THIS STATION** on floor below, where they are pitted (7), next candled (8). Cherries then go into barrels, preparatory to washing operation (start of diagram above).



FRUIT is automatically poured from barrels into washer by pushbutton elevator-dumper. Washed cherries are then pumped through plastic pipe to one of processing kettles.

from brine tanks to plant is of 3-in.-dia. plastic tubing.

The recirculating pump moves fruit to an intermediate storage tank in the stemming-pitting plant. Excess brine is returned to the tanks by a pump through a 2-in. plastic tube.

Cherries cushioned in brine are pumped from the intermediate tank by another bladeless-impeller pump. They move over a brine separator to an elevator leading to the stemmer.

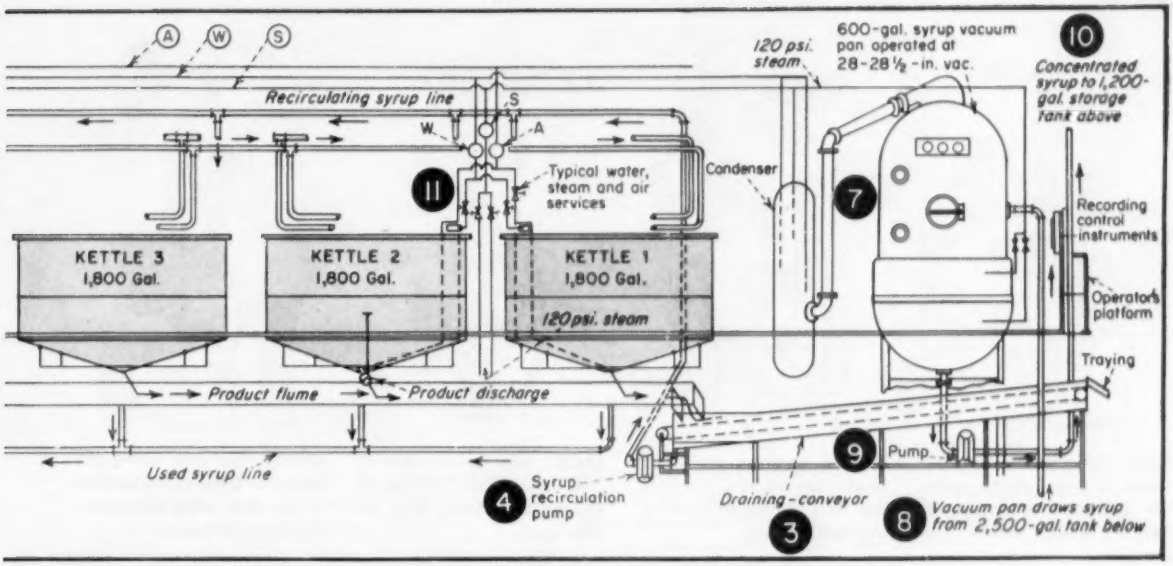
This stemmer discharges onto an inspection belt, where operators grade the fruit for quality and remove any stems missed by the machine. A shaker-grader channels the cherries into five sizes, and they are then chuted into barrels on the lower floor.

Next, sized fruit is manually fed to the pitter, which discharges onto a conveyor leading to the candler. At this stage, cherry meat is translucent. And, the fluorescent light, located below the perforated conveyor, enables the operators to see and remove any unpitted fruit.

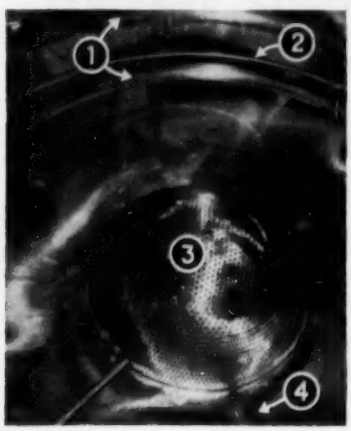
EQUIPMENT EMPLOYED in this advanced system, and names of the manufacturers, are noted at end of article (page 137).

Putting in the Efficiency

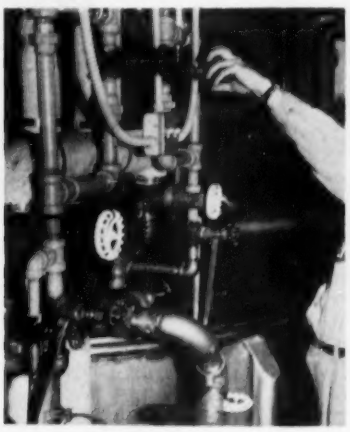
Fruit is then barreled by size and grade, with a waterproof, heavy asphalt laminated paper securely fastened over the top with the barrel-hoop. This "paper cooperage" provides sufficient product protection for the time required for transport from Sebastapol to the San Francisco plant. It also eliminates costly fitting of



volumetrically measured into process. Fresh liquid sweetener is pumped to kettles through a tube from a tank on floor below. This tank is kept under 68-80 psi. air pressure to maintain proper line pressure and desired delivery rate to meter. Vac system (7) draws used syrup through line (8). Concentrated to 76 Brix, it's pumped (9) via a plastic tube to storage tank on floor above (10). Each kettle is served (11) by compressed air (A), water (W), steam (S).



KETTLE DETAILS. Steam coils (1) provide process heat. Product is agitated by compressed air from coil (2) and line under perforated dome (3). Drain (4) leads to discharge.



FOR CONVENIENCE of operator, valve handles are located directly adjacent to kettle served. They're painted in different colors, designating various services and materials.

ACTION VIEW. Fresh sweetener goes into kettle to maintain desired syrup Brix. Cherries and syrup are in compressed-air agitation, controlled by setting of automatic air valve.

wooden heads into barrels and facilitates fruit dumping.

For best efficiency in operation, mass production, and quality control, this system employs special-design kettles of relatively large size. The small hand-tended kettles are "out".

Cherries are sensitive to even minute quantities of heavier metals, especially copper. So specifications called for stainless steel or plastic for all parts that contact product.

Process kettles, subject to action of the sulfur dioxide, are constructed of #316 stainless. Vacuum pan, syrup storage tanks, and pipe lines (other than plastic) are of #304 stainless. Wherever high temperature (above 140 deg. F.) isn't a factor, plastic pipes substitute for stainless.

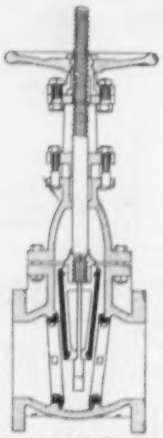
Kettles have dished bottoms for efficient drainage. A discharge pipe drains blanching water to sewer or syrup to holding tank. A perforated dome, over this outlet, prevents fruit from flowing out this pipe. Finished product is discharged through an opening at the side and near the bottom of the tank.

Two circular coils provide heat for processing. Steam inlets to these coils are on directly opposite sides of the kettle.

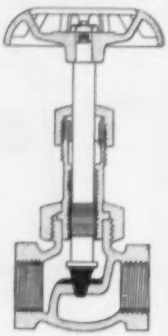
Design Factors

Earlier tests demonstrated that a single coil heated the product unevenly, due to the temperature drop in that part of the coil opposite the inlet. However, we have now equalized temperature, eliminated hot spots, and insured getting uniform heating —by putting a smaller coil within the

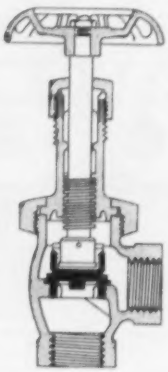
(Turn to page 136)



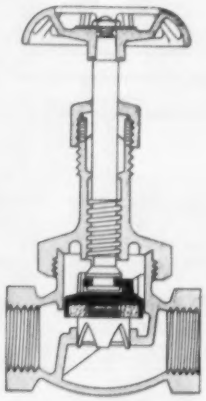
GATE VALVE has outside screw & yoke, rising spindle. Double disk seat seals flow by wedge action.



NEEDLE employs stainless-steel, tapered disk for fine-line flow control and metering applications.



ANGLE has union bonnet and bevel-disk. You save fittings by putting it at elbow spots.



GLOBE features one-piece bonnet. Removable composition disk helps valve stay tight at all times.

F. J. McCLOUD
Chief Engineer

Do You Know

And the Way to Use

Here's a brisk refresher "course" for every plant man. It points up tips on these too-often-neglected items.

One of the most numerous items around any food processing plant is the valve.

And that's just the trouble. Valves are so common, we frequently don't stop to realize that they are also expensive.

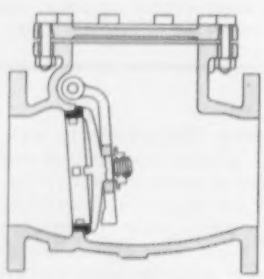
To get full value from this equipment, we must know what types are specifically designed for each job.

So here's a rundown on the standard ones—what they are made out of, where they are used, and some practical tips on how to maintain them to insure longer life.

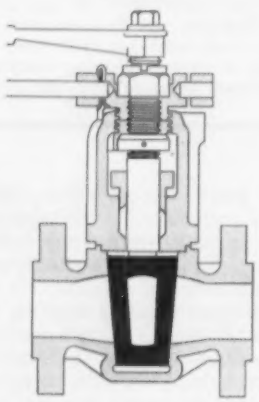
Common valve metals are brass, bronze, iron, and steel. When you select valves for steam, cold water, oil, and gas service, any of these metals are usually satisfactory. But remember, each has certain limits.

For example, never use brass for applications above 550 deg. F. Bronze will take temperatures up to 700 F. and a pressure of 350 psi. Valves made from these metals usually come in the smaller sizes, up to and including 3 in.

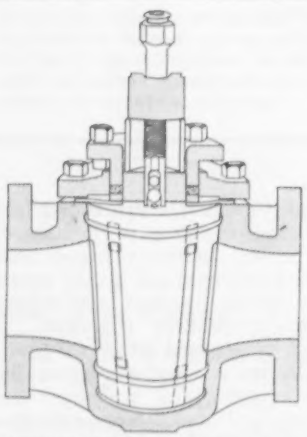
Above this size, use iron to 250 psi.



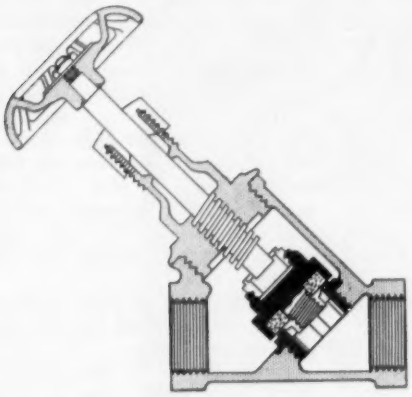
SWING CHECK has bolted cover and disk in larger types. It is used in horizontal pipe lines to prevent backflow.



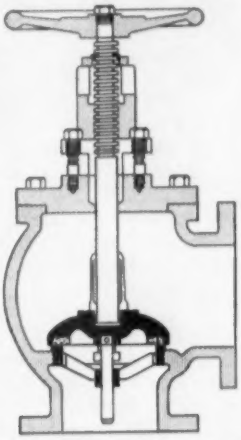
PLUG has stickproof feature. Tapered plug is loosened before opening and closing, then tightened to hold position.



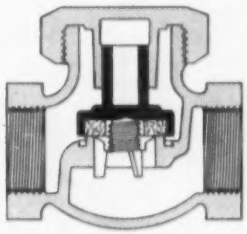
LUBRICATED PLUG contains grease under pressure. Grooves distribute lubricant, and thus prevent 'freezing' in severe conditions.



Y-TYPE VALVE has all the good features of a globe valve, in addition offers less resistance to fluid flow in line.



STOP CHECK: With stem up, pressure lifts disk. Closed, it serves as a stop valve.



CHECK VALVE has a one-piece cap, renewable composition disk. It prevents backflow.

Your Valves?

And Maintain Them?

and 500 F. Steel is better for temperatures above 500 F. And it is also used when valve must withstand high internal or external pressures and shock.

Those Markings on Them

Always check valve bodies for markings before installation. "A2", "A-4", etc., on the body indicates the smallest pipe size the value should be used with. If body is marked *200WOG*, that means the valve is safe for no more than 200-psi. service on cold water, oil, or gas lines.

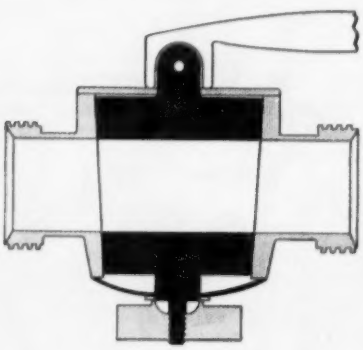
Or, a valve may be marked *125* or *125S*. This tells us it is for 125-psi., saturated-steam service at an equivalent temperature of 344 F. However, this same valve can be used for cold service up to 300 psi.

But remember: It is dangerous to use a cold valve for a hot application.

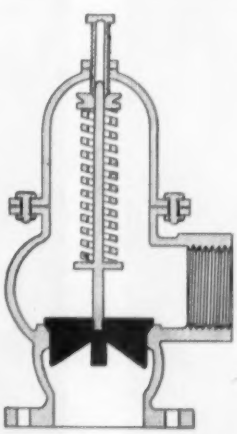
Many valves are also marked on the body with an arrow. This shows direction of liquid flow for proper valve operation, and so should be noted when installing the unit.

Valve Types and Uses

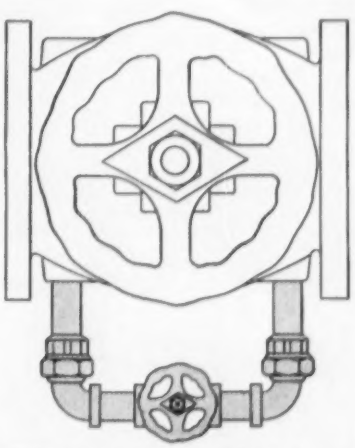
▶ **Gate valves** are about the commonest. They are named for the wedge, or gate, that lifts to permit full, free flow. This valve is not designed for quick-closing, throttling, or close-control operations. Reason is that the disk must be opened full diameter of the valve, making operation slow. Also, throttling causes severe wire-



SANITARY is a plug valve built for thorough cleaning. Leverage on handle raises plug, permits easy turning.



RELIEF has adjustable spring tension that permits valve disk to lift at pre-set pressure.



BYPASS prevents wiredrawing in larger valves. It allows steam to bypass big valve, equalizing line pressure.

drawing (erosion) of the sealing surfaces. Then next time the valve must be tightened, there's trouble—a leak.

▶ **Globe valves** get their name from the body shape. This type is very popular for flow control, because the disk travels only a short distance from full-open to closed position, saving operator's time.

Fact is, the disk need only lift one-quarter of the valve diameter to do the trick. However, in practice, the valves open slightly more to cut flow resistance.

With these units, wear on the disk caused by throttling is easily remedied by replacing or regrinding disk and seat. Many of these units even have replaceable fiber disks that eliminate grinding.

The disadvantages to this type valve is that it offers more resistance to fluid flow than does the gate valve.

▶ **Angle valve** is a type of globe valve. It can be used for a 90-deg. turn in the line. By thus replacing an ell, it reduces number of needed fittings. Fewer fittings means less resistance.

▶ **The Y-type valve** has all the good features of the globe valve—and gives less flow resistance. It has always been popular for blowing down boilers, and is now finding increased use in many other places.

One strong advantage to any globe valve is its availability with composition disks. This non-metallic insert "gives" a little when the valve is closed, thus permitting the disk to adjust itself to any scale or other foreign matter on the valve seat.

▶ **Needle valve** resembles a globe valve, but it has a tapered disk. Use this unit where extremely close regulation is needed. The taper fits accurately in its seat, giving drop-tight closure with little tightening effort.

▶ **Check valves** are needed for many services in food processing plants. They are used as safeties to prevent backflow in a line. They can also be employed to keep a liquid line full when a pump is shut down. In this application, the check unit is known as a foot valve.

A check valve operates automatically. Flow keeps it open, and gravity closes it. Swing-checks are used in series with gate valves, and operate in either vertical or horizontal position. The lift-check teams with a globe or angle valve. It is made in three types: Angle, horizontal, and vertical.

A special type of lift check valve is the stop check. Use this unit on parallel boiler installations to prevent steam backflow.

In this valve, the stem is not connected to the disk. It acts only as a wedge to hold the disk down. Raising stem allows pressure to raise disk.

▶ **Plug valve** or cock has a tapered plug with a hole. Liquid flows when this hole is turned to line up with pipe openings. It is a quick-acting valve that easily handles thick or dirty fluids. However, keeping it tight can be a problem at times.

Plug valves come in various designs. But basically all of these types operate in the same manner.

A disadvantage in this valve is that it often sticks—because of the tight fit between body and plug. To solve this problem, some plugs can be raised against a spring-plate by means of leverage on the handle. This gives more clearance and eases turning.

Another solution is found in the lubricated plug valve. This device has lubrication grooves running around the diameter of the plug at both ends, and also vertical grooves. Such passages are pressure-filled with grease, and prevent the tapered plug from sticking.

Another type of plug valve—commonly used on food product lines—is the sanitary valve.

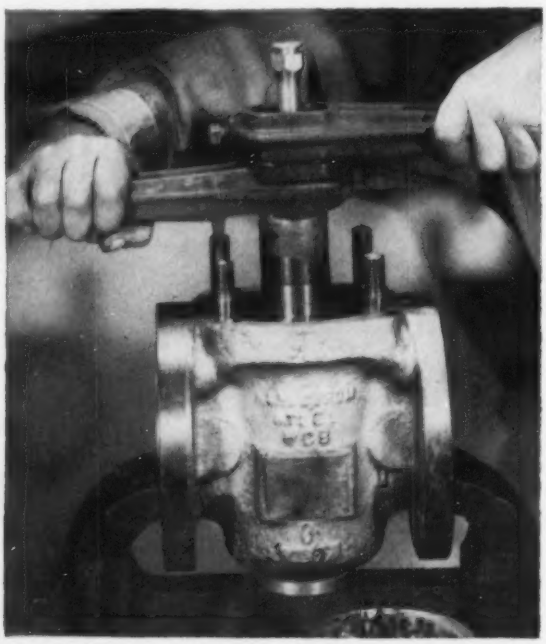
Chief feature of this unit is its quick disassembly. Plug is held in the body by only a single thumb nut, and the handle is attached by a removable pin. Constructed of stainless steel, such valves are specially designed for easy and thorough cleaning.

▶ **Spring relief valves** are installed on all pressure vessels—both fired and unfired—to relieve excess pressure. They are available in several types, and are made of varying metals to suit different vapors, liquids, pressures, and temperatures. Valve inlet is connected to a vessel (or a pipeline). Discharge is joined to a drain line.

Usually, a stem actuates the valve disk. A regulating spring on the valve-stem is adjustable to any predetermined pressure (within the valve range). And valve is set to open within fairly narrow limits.

For this reason, be sure to install these units according to the valve

PLUG VALVES that are pitted or scored can be lapped-in with grinding compound. Applicable to other valves, too.



ROTATING plug or disk on seat grinds out pits. On large valves, it is best to use a jig to hold work true.

Polyethylene bags for "Foulds" egg noodles are supplied by **Fortune Plastics, Inc.**, Westbrook, Conn.

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"For example," explains S. A. Wilde, general manager, Foulds' Macaroni Division, Grocery Store Products Company, Libertyville, Ill., "we have realized a saving of 6 cents per case in packing labor . . . eliminated a 4% to 5% 'waste' factor . . . simplified our problem of inventory storage because rigid temperature and humidity control are no longer necessary. Moreover, the polyethylene doesn't become brittle and crack in cold climates . . . it takes machine-filling methods easily, and a *sure* heat-seal every time.

"Before the change, spoiled and damaged reject units were hitting us hard with returns of hundreds of dollars per month. Polyethylene changed all that, cutting return cost almost 90%, at the same time that sales have risen 300%!"

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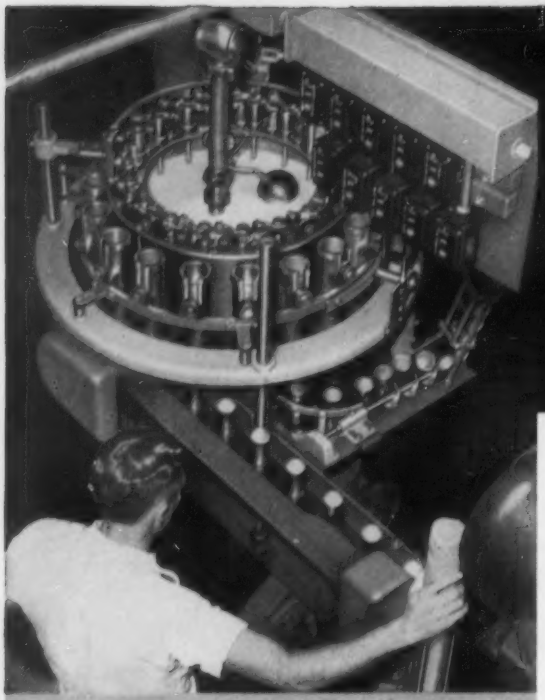
CUT PRODUCT WASTE with Librascope PISTON Fillers



PAT PEND.

18-station model canning orange juice concentrate in large citrus processing plant.

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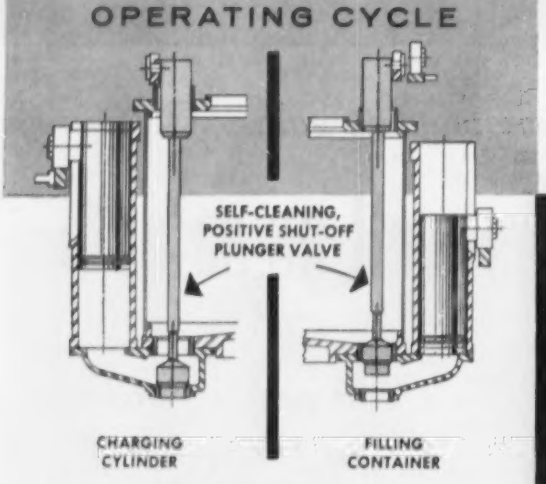
Are you losing product through overfilling? Then why not investigate the new concepts of accuracy incorporated in Librascope Piston Fillers. With this improved filler, you cut product waste, fill more containers, and realize greater profits. You eliminate wasteful overfilling to meet label regulations, protect against underfilling. You get a cleaner fill without messy and costly dripping and splashing.

VALVE DESIGN INSURES GREATER ACCURACY

The exclusive Librascope plunger-type valve, illustrated, is engineered to eliminate filling inaccuracies and provide a cleaner fill. Valves are equipped with metal-to-metal discharge seats that positively control leakage. A unique self-cleaning feature eliminates product build-up, completely purges valve guides and ports with each filling cycle. Precision machined pistons (to .001") further insure accurate product measurement.



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RETORT BASKET LOADERS AND UNLOADERS
DOLE ASEPTIC CANNING EQUIPMENT • UNIVERSAL CASE PACKERS

markings for proper service. On liquid lines, reliefs are usually set 25% above actual working pressure. This assures tightness at the desired pressure, yet does not exceed maximum pressure shown on the valve body.

Accidents have happened in food plants due to a frozen, relief-valve discharge. This can occur when valve is installed outside buildings—instead of inside, where heat prevents freezing.

The safety valve for relieving boiler pressure is of the pop-type. Here, disk remains open until about 6% of the total steam pressure is relieved. Then the unit closes with a bang. This prevents simmering, which in turn causes wiredrawing of the valve seat.

Because relief valves are safety devices, be sure you understand boiler and other code regulations before installing them.

Valve Opening Devices

Valve operation is largely dependent on the type of stem, and the manner in which it attaches to valve body and disk.

▶ **A rising stem** is the simplest, and is common on globe and angle valves. It also appears on gate valves with split wedges, where stem turns freely in the gate.

▶ **Non-rising stem** is threaded to the disk, which travels up and down the stem. Because of this feature, the design is used only on gate valves. To enable conventional operation, stem is given a left-hand thread. Then turning stem clockwise causes disk to go down, closing valve.

▶ **Outside screw and yoke (OS&Y)** has a threaded hand wheel that turns, but doesn't rise. When it is rotated, stem lifts without turning. Such a device is used on solid-wedge gate valves. A benefit is that the threaded portion of the stem is entirely outside the valve body, thus making threads easy to lubricate and also freeing them from exposure to line conditions.

Valves of the rising stem and OS&Y types have the additional feature that it is simple to see at a glance whether they are open or closed.

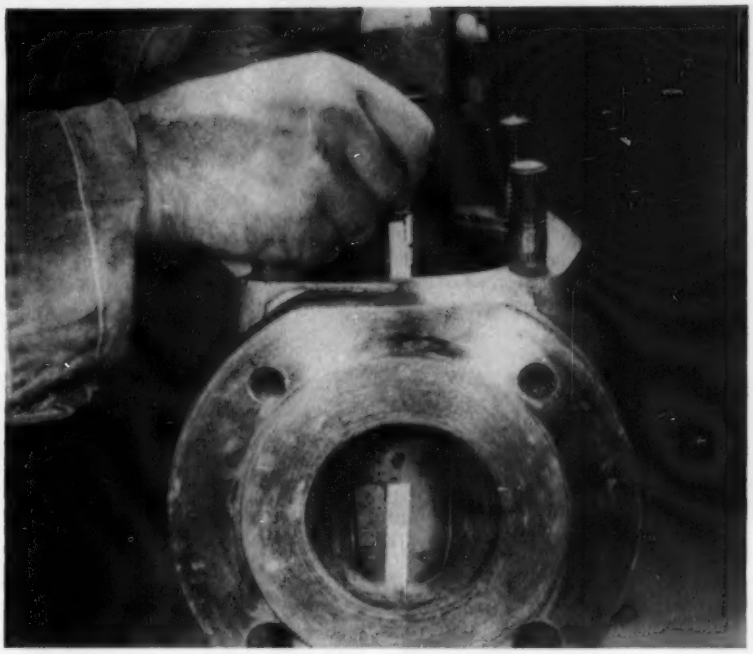
Various Bonnets

There are three general types of bonnets—the valve top containing stuffing box and stem mechanism.

▶ **Screwed-on** is the simplest of these, being of one-piece construction. It is used on small, low-pressure valves, but is not suitable when the body must be opened frequently or where shock and vibration are encountered.

▶ **Union-ring bonnets** have internal parts that are easy to inspect, repair, and service. This bonnet type further protects the valve body against internal pressures and distortion. But it is practical only on valves up to a certain size.

▶ **Bolted bonnets** are the most rugged, thus are used on almost all large valves. Here, a gasket between body and yoke enables valve to withstand high pressures and temperatures.



FEELER STOCK is used to check taper of plugs. Also, plug can be blued and rotated in valve body to pinpoint accuracy of fit.

Pipe-Valve Connections

Brass, iron, and stainless steel valves, in the smaller sizes, usually have screw ends. Larger sizes have flanged ends. Solder connections are employed when a valve is to be joined to copper pipe and tubing. Steel valves may also have welded ends.

Bypasses are used on steam lines to prevent water hammer by equalizing pressure and temperature on both sides of the valve. Water in the steam or dead side of a line causes tremendous vibration if the valve is opened too quickly.

However, the slow opening of a large valve can cause wiredrawing of seat and disk. Hence, the need for a bypass line. Wiredrawing is not a problem here, because this valve has only a small seating surface. There is another trick that aids valve operation on hot lines. After opening a valve fully, you should then close it one-half turn. This prevents the valve from binding in the open position due to heat.

When closing valves, never use a wrench or other tightening device to insure a seal. If a valve leaks when closed under hand pressure, the seat and disk should be repaired. Forcible closing will score the seat and disk so badly that the valve must be discarded.

MAINTENANCE TIPS

Preventive valve maintenance simply means lubricating stem threads (if exposed) and bearings (if there are any), and tightening packing nuts or glands to prevent needless leakage around the valve stem.

Extensive repairs depend on service. Repacking of stem glands is an operation that varies with conditions. Sometimes it must be done while the valve is under pressure. Some valves are designed for this condition, hence can be repacked with valve wide open.

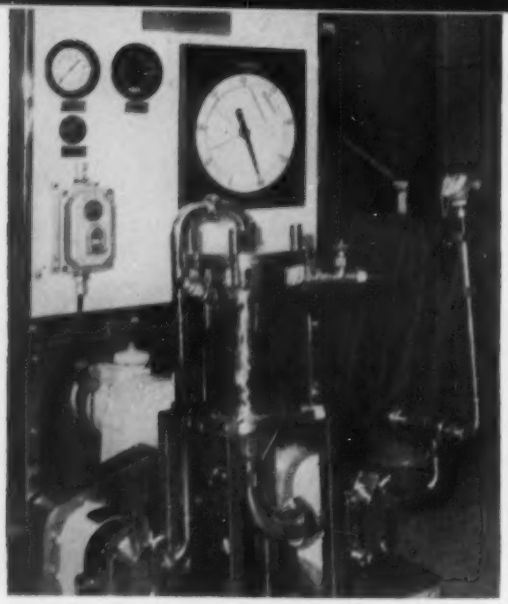
If a valve leaks, repair it at once. Neglect can cause seating surface to become so badly wiredrawn that valve must be scrapped.

Gate valves are repaired by lapping-in disks and seats with fine grinding cloth.

Metal disks of globe valves are repaired by grinding them against valve seats with an abrasive compound (such as emery powder in oil). Use a slug, coin, or pin to take up play between disk and stem, and force disk to turn with the stem.

Some valves when ground cold will not be tight after they are heated.

(Turn to page 175)



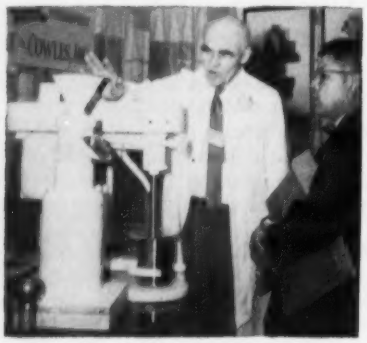
Latest Process and

4 Process Units

CALEFACTOR is designed for steam-injection heating of thin film of product up to 300F. on continuous basis and without product turbulence. Thermally engineered, instrument-controlled system eliminates burn-on, reduces labor costs, and increases production capacity. Available in models handling 5-8 and 40-50 gpm. (See article, FE June, p. 68.) Maker: The W. J. Fitzpatrick Co., Chicago. (78A)

FLOCRON, high-speed dispenser, comprises photoelectric circuits that activate apportioning and assure fast accuracy. Remote electronic controls permit dialing of any amount of liquid goods on lines turning out up to 300 units per min. Handles wide variety of liquid products.—Exhibitor: Morton Salt Co., Chicago. (78B)

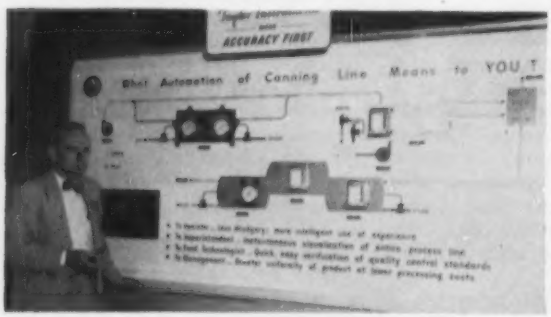
UP TO 2,000 LB./HR. is performance of this peanut butter milling-stabilizing machine designed also to handle whole fruits, like oranges. Equipped with variable-speed feeder (not seen). Also provides metering of salt, sugar, etc., at blender. Products ground between carborundum stones.—Morehouse-Cowles, Inc., Los Angeles. (78C)



VERSATILE, small-scale dissolver can be run rapidly and economically by lab technician to correlate results with plant-size unit. Designed for 2-gal. container, suitably clamped. Speed changes made with hand knob. Impeller-height adjustment made with 8-pitch screw having 2:1 gear ratio. —Morehouse-Cowles, Inc., L. A. (78D)

2 Instrument Setups

GRAPHIC PANEL employs recorders and indicators on front and has controllers in rear of board to monitor process variables. System shown carries out centralized control of pea or corn canning lines.—Taylor Instrument Cos., Rochester, N. Y. (78E)



THIS pneumatically operated temperature transmitter combines narrow-span feature with high accuracy and rapid response for close process control. Sensitive force-balance is basic principle.—Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia 1. (78F)

Control Equipment

Production and instrumentation units, lab-test devices, and sanitary fittings are carefully scrutinized by IFT'ers at meeting in St. Louis

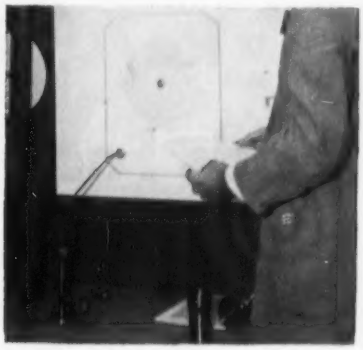
CIP System

FITTINGS designed for in-place cleaning comprise: (1) Teflon adapter to go from 3-A beveled seat in fitting, and (2) flanged ring consisting of rubber bonded to stainless steel. Male and female pipe ends serve to locate ring concentrically and laterally. Tapered part of rubber compresses to seal joint, providing flush, crevice-free bore.—Walker Wallace Div. A.P.V. Co., Buffalo, N. Y. (79A)

6 Test Devices

PRECISION high-speed refractometer is easy to load and wipe clean. Impeller-height adjustment made with scanning and fine-line setting at a finger touch. Refractive index range: 1.30 to 1.71. Solids read 0 to 85%. Manufacturer: Bausch & Lomb Optical Co., Rochester, N. Y. (79B)

QUICK, accurate, semi-automatic moisture tester features arrangement of balance and oven in one simple self-contained unit to eliminate desiccator. Forced-draft principle is applied in oven. Turntable handles 10 samples.—C. W. Brabender Instruments, Inc., S. Hackensack, N. J. (79C)

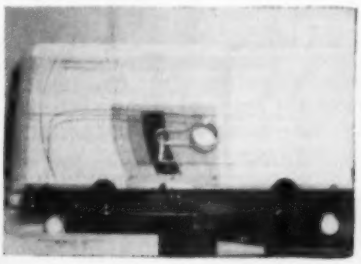


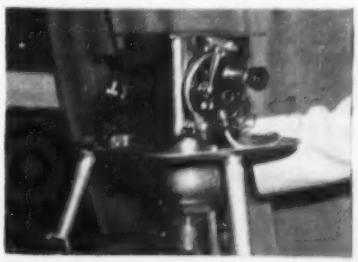
OXYGEN BOMB TEST checks relative stability of fat-containing foods. Here, O_2-purged bomb is brought to 100-psi. pressure, immersed in 100F. water bath, and hooked up to pressure recorder to check pressure drop. —Eastman Chemical Products, Inc., Kingsport, Tenn. (79D)

TRANSPARENT Votator-type heat-exchanger is lab model equipped with stroboscope to permit technicians to see action of rotating scraper blades on refrigerated tube wall and observe emulsification of products. Displayer: The Girdler Co., Votator Div., Louisville, Ky. (79E)

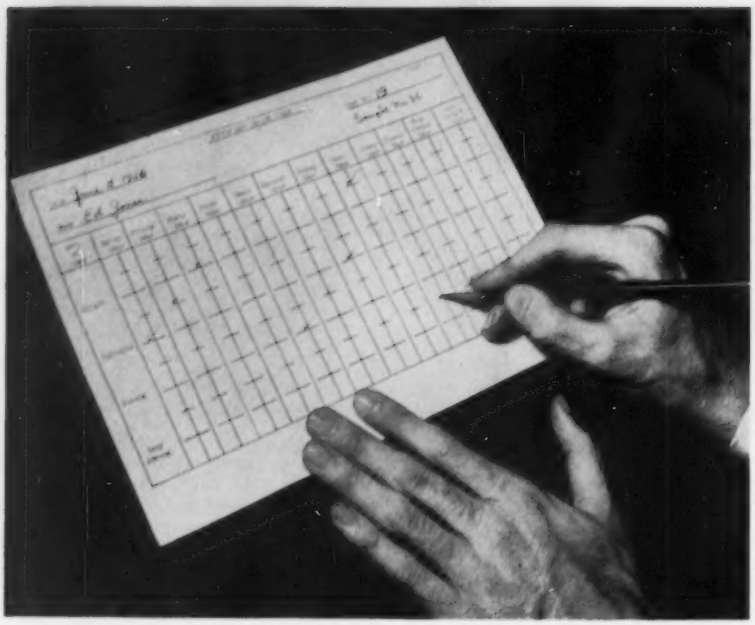
RUGGED, accurate unit expresses Farinograph baking strength in single numerical value. Of slide-rule type, it has 0-100 scale values into which all wheat varieties fit. Weakest fall between 18-20; strongest 90-95.—C. W. Brabender Instruments, Inc., S. Hackensack, N. J. (79F)

NEW refractometer is designed for precise in-stream control of soluble solids of products. Adapts into process tanks, pipelines, evaporator steam jacket, etc. Gages turbid or high-color liquids. Abolishes time and expense of conventional sampling.—American Optical Co., Buffalo, N. Y. (79G)





For detailed data on units, circle key numbers on Readers' Service card in front of book



FILLING IN general score sheet. It lists pertinent food product characteristics agreed upon by panelists, in horizontal line. Their intensity is then checked on vertical scale. Followed through from original product to lab-separated fractions, method helps trace movement of vital odor constituents.

Re-Aimed Sensory Testing Aids Food Analysis, Formulation

By isolating flavor "notes" of natural products, researchers guide makeup of synthetic foods—and even give advice on selecting final processing methods

T. HASSELSTROM, E. J. HEWITT, K. S. KONIGSBACHER, & W. H. DANKER

Respectively, Chief, Organic Chemistry Research, QMC Research & Development Command, Natick, Mass.; Vice-President, Evans Research & Development Corp., N. Y. C.; and Evans project leaders

HERETOFORE, sensory tests have been used only to evaluate food tastes and odors, to compare competitive goods, and for quality control of both raw materials and finished products.

Now, we have developed a new application for these standard panel techniques that greatly speeds chemical analysis of flavor constituents—then guides formulation of imitation food products, from first lab experiments to final production methods.

However, before this goal was reached, we had to perform some basic groundwork. For, it was necessary to select a method for picking panel judges, and then develop a list of descriptive terminology for the sensory characteristics of each food tested. Previously contrived methods covering this latter point were found generally unsatisfactory.

TRIANGLE TEST KIT is used to screen judges for panel work. Two of the three samples are identical.

Panel members were screened by means of the triangle test, because its results could be conveniently analyzed through statistical methods*. And also, because the test had been used previously for the same purpose**.

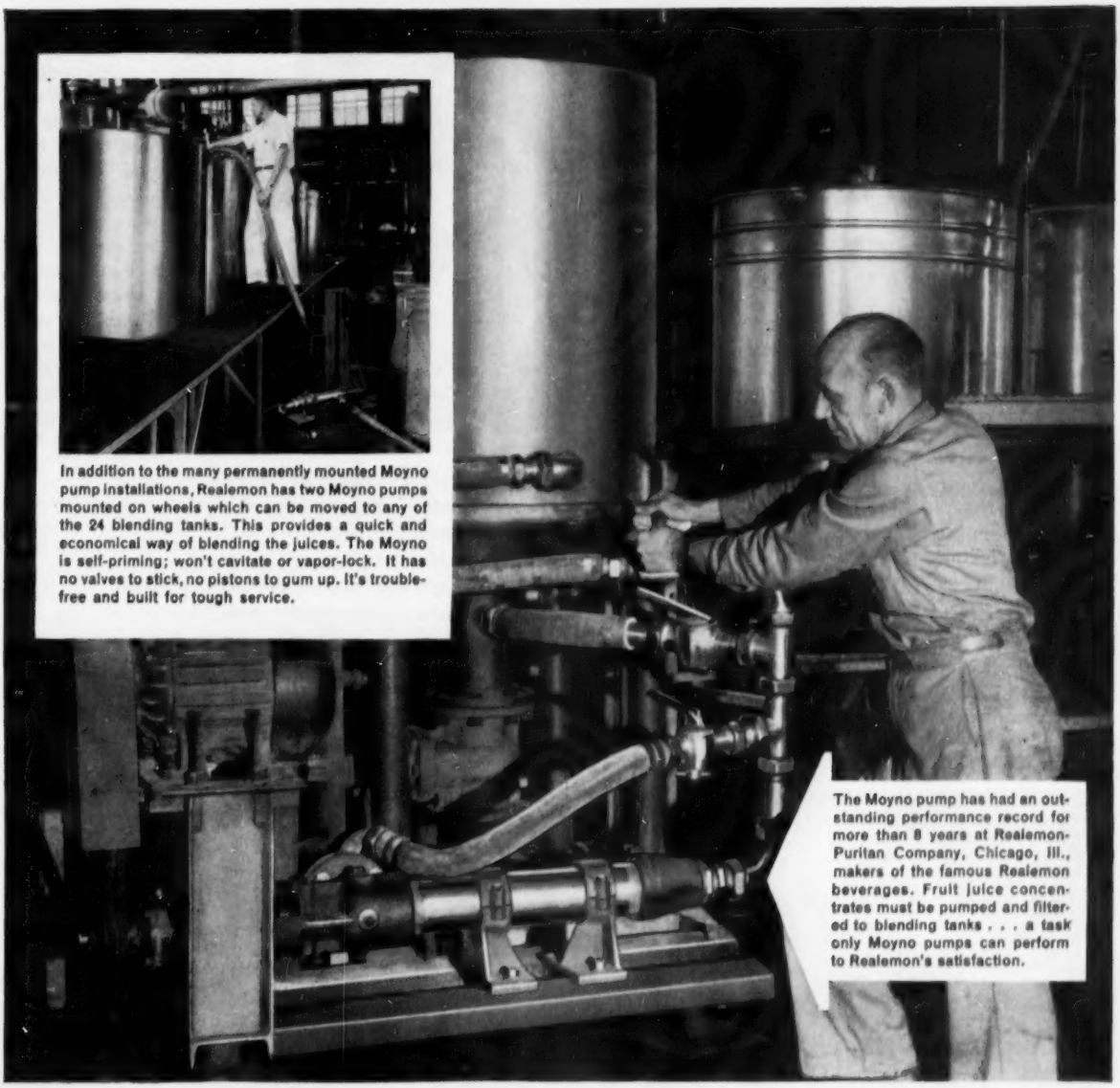
With this gage, prospective judges are presented three samples, two of which are identical. Test materials are placed in 250-ml., glass-stoppered Erlenmeyer flasks. Wire-mesh screens are suspended in the necks of these flasks so judges cannot see samples.

Then flasks are placed in cardboard boxes. Their necks protrude through the top (see photo). Boxes are permanently coded, but positions of odd samples in the different sets are randomized. To avoid bias, candidates are isolated in separate booths while attempting to pick the odd sample.

From these tests, we chose only the highest-scoring men for our panel. Only those tests where the significance level was less than 5% were taken into consideration. And tests having more

*K. S. Konigsbacher, W. H. Danker, and R. L. Evans, *Proceedings of the Scientific Section of the Toilet Goods Assn.*, 16:11-15, 1951.

**E. Helm and B. Trolle, *Wallerstein Laboratory Communication*, 9 (28): 181, 1946.



In addition to the many permanently mounted Moyno pump installations, Realemon has two Moyno pumps mounted on wheels which can be moved to any of the 24 blending tanks. This provides a quick and economical way of blending the juices. The Moyno is self-priming; won't cavitate or vapor-lock. It has no valves to stick, no pistons to gum up. It's trouble-free and built for tough service.

The Moyno pump has had an outstanding performance record for more than 8 years at Realemon-Puritan Company, Chicago, Ill., makers of the famous Realemon beverages. Fruit juice concentrates must be pumped and filtered to blending tanks . . . a task only Moyno pumps can perform to Realemon's satisfaction.

Moyno® Pump exclusive choice of Realemon engineers for pumping juice concentrates

In the preparation of many of the famous Realemon products, concentrated fruit juices often must be pumped and filtered to blending tanks.

Pumps formerly used to handle this exacting process wore out completely in a few months because of their inability to stand up under the high acids in citrus juice concentrates.

Realemon then changed to the Moyno pump. Its unique rotor and stator arrangement forms sealed progressing cavities that move the material and provide positive displacement. For this Realemon application, Moynos with chrome-plated rotors and synthetic rubber stators were selected, to assure trouble-free service and long pump life.

Moyno pumps have now been in operation at Realemon for more than eight years, with an outstanding performance record. The only maintenance required is simply to replace the rotor and stator about once a year.

Moynos regularly handle a wide variety of products that other types of pumps can't handle—products such as potato salad, chow mein, fruit, alkalis, pastes, paints, tar —even cement and plaster.

Perhaps the Moyno will solve your pumping problems, too. Write us today for complete information. Ask for a free copy of Bulletin 30-FE.

ROBBINS & MYERS, INC.

MOYNO PUMP DIVISION

Springfield, Ohio
Brantford, Ontario

For more data, circle this page number on card at front →

He showed this dairy the way to 6 carton improvements with Super STANISEAL Wax

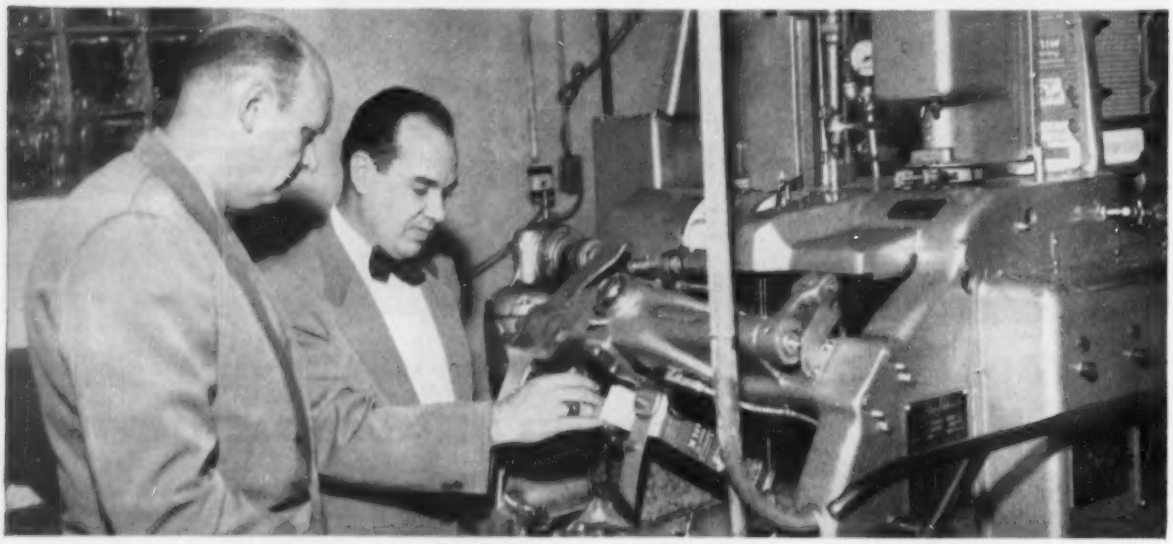
Brighter carton appearance, better processing of wax among benefits Heart of Iowa Dairy received by converting to Super STANISEAL

Operator Joe Lang (left) and Standard Oil man Jesse Nelson inspect carton coated with Super STANISEAL Wax. As expected, they find clear, bright finish. Jesse Nelson has been providing technical service to customers with wax problems for more than three years. With a degree in engineering from the University of Iowa and a graduate of the Standard Oil Sales Engineering School, Jesse is well qualified for such work. Customers find this experience and training pay off for them.

When Standard Oil man Jesse Nelson called on Heart of Iowa Dairy, he found the management dissatisfied with the milk cartons being produced. Carton colors lacked brightness and clarity. Leakers due to poor wax coverage were another problem. Operators had trouble keeping enough wax melted without shutting down the machine. Three brands of wax had already been tried, all gave the foregoing disappointing results. Jesse Nelson proposed a change to Super STANISEAL Wax. Nelson and machine operators, carefully checked temperature of the wax and of the cooler, also the amount of wax used per carton. With Super STANISEAL Wax, here are the results obtained:

1. Consumption of wax reduced 14%.
2. Wax residue in the preheater eliminated.
3. Wax melting problems checked.
4. Carton finish smoother and brighter.
5. Leakers and wax flakes in cartons eliminated.
6. Customer's carton complaints ended.

Perhaps your Standard Oil man can show you how to obtain similar results by switching to Super STANISEAL Wax. Call him. There is one nearby in any of the 15 Midwest and Rocky Mountain states. Or write, Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.



Jesse Nelson (right) discusses operation as Heart of Iowa president George F. Day observes. Dairy switched to Super STANISEAL Wax and got 6 important carton improvements.

***Quick facts about* Super STANISEAL Wax**

- Is a balanced blend of highest quality wax and polyethylene.
- Virtually eliminates wax flaking in milk.
- Has greater wax strength. Result: fewer leakers, fewer rejects.
- Cuts wax scuff-off on machine.
- Is especially formulated to eliminate wax bubbling.
- Produces a smooth, even coating that gives sharpness to colors and enhances appearance of finished carton.

STANDARD

STANDARD OIL COMPANY
(Indiana)

than 90% correct answers were discarded, because the right choice was too obvious.

Odor Factors Pinpointed

Then came the matter of terminology. Since different materials obviously cannot be rated by the same characteristics, judges were instructed to list every distinct odor "note" that they perceived when examining each product.

Their suggestions were tabulated and discussed in a round-table session. Those notes considered pertinent by a majority of judges were made up into a score sheet. On this sheet, intensity of each odor characteristic was defined over a 9-point scale, ranging from none (0) to very strong (8).

Actual ratings, made on natural pepper and on chemical fractions prepared from it (Table I), show that some odor characteristics distribute themselves between all three fractions. Some are concentrated in only a single fraction. But most important, the tests disclosed that spiciness and true pepper aroma are combinations of different notes—in all fractions.

Further, comparisons between natural black peppers revealed that each one was characterized by a different odor pattern. As expected, there was a greater variation in some characteristics than in others.

Breakdown Aids Analyst

These flavor facts were put to good use in subsequent chemical analysis of the foods—particularly in selecting the fractions and principles to be examined by the chemist.

For, flavor characterization aids greatly in determining degree of separation attained by fractional distillation, chromotagraphy, and exhaustive extraction.

Fractions found by the panel to contain the more important flavor notes were investigated first, while the others were set aside for possible future examination. This selective technique has cut research time 25%.

Building the Synthetics

After aromatic constituents were isolated, the newly-modified panel techniques were found to be invaluable in preparing good imitation products.

Here, first requirement was an adequate qualitative and quantitative definition of desired aroma, since a natural material varies considerably in odor notes, depending on its source.

The panel was a valuable asset in defining these variations, setting up

(*Turn to page 95*)

Table I — How pepper odor notes breakdown in product fractions

Characteristics	Pepper A			Fraction 1			Fraction 2			Fraction 3		
	No	Total score	Average	No	Total score	Average	No	Total score	Average	No	Total score	Average
Spicy	22	115	5.2	22	41	1.9	22	59	2.7	22	49	2.2
Fruity	22	32	1.5	22	38	1.7	22	40	1.8	22	15	0.68
Musty	22	11	0.50	22	56	2.6	22	16	0.73	22	43	2.0
Burnt	22	7	0.32	22	51	2.3	22	27	1.2	22	27	1.2
Heavy	22	8	0.36	22	18	0.82	22	34	1.6	22	24	1.1
Camphor	22	18	0.82	22	22	1.0	22	45	2.1	22	22	1.0
Resiny	22	30	1.4	22	24	1.1	22	42	1.9	22	35	1.6
Sweet	22	43	1.9	22	28	1.3	22	48	2.2	22	27	1.2
Sharp	22	51	2.4	22	26	1.2	22	60	2.7	22	38	1.7
Floral	22	14	0.64	22	14	0.64	22	18	0.82	22	10	0.45
True pepper	20	100	5.0	22	46	2.1	22	48	2.2	22	51	2.3
Non-pepper	20	21	1.1	22	80	3.6	22	92	4.2	22	72	3.3

Table II — Characteristics compared, naturals vs. synthetics

Characteristics	Pepper A			Pepper B			Imitation A			Imitation B		
	No	Total score	Average	No	Total score	Average	No	Total score	Average	No	Total score	Average
Spicy	22	115	5.2	25	104	4.2	8	37	4.6	9	39	4.3
Fruity	22	32	1.5	25	78	3.1	8	31	3.9	9	40	4.4
Musty	22	11	0.50	25	7	0.28	8	21	2.6	9	8	0.89
Burnt	22	7	0.32	25	4	0.16	8	6	0.75	9	6	0.67
Heavy	22	8	0.36	25	32	1.3	8	34	4.3	9	23	2.6
Camphor	22	18	0.82	25	50	2.0	8	13	1.6	9	16	1.8
Resiny	22	30	1.4	25	19	0.76	8	17	2.1	9	25	2.8
Sweet	22	43	1.9	25	56	2.2	8	37	4.6	9	39	4.3
Sharp	22	51	2.4	25	44	1.8	8	25	3.1	9	19	2.1
Floral	22	14	0.64	25	28	1.1	8	18	2.3	9	20	2.2
True pepper	20	100	5.0	23	115	5.0	8	24	3.0	9	27	3.0
Non-pepper	20	21	1.1	23	25	1.1	8	37	4.6	9	34	3.8

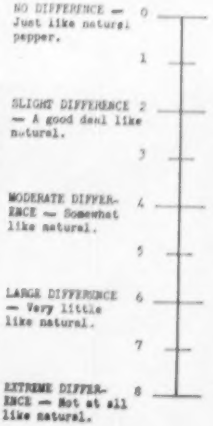
Table III — Synthetics rate higher than real peppers, odor-wise

Product	Trained panel				Novice panel			
	No	Natural	Synthetic	Rating	No	Natural	Synthetic	Rating
Pepper S	10	6	4	2.1	67	34	33	2.5
Pepper A	10	10	0	1.2	33	24	9	2.0
Pepper L	18	13	5	1.5	39	22	17	2.8
Pepper T	28	25	3	1.5	20	19	11	1.7
Pepper M	30	24	6	0.7	31	19	12	2.2
Imitation D	38	9	29	4.1	34	10	24	3.3
Imitation E	38	15	23	3.9	34	9	25	4.0
Imitation F	38	14	24	4.3	34	7	27	4.3
Imitation G	38	14	34	4.7	20	1	19	4.6
Imitation H	20	5	15	4.0	34	7	27	3.9
Imitation I	18	0	18	5.1	19	2	17	4.0
Imitation J	18	2	16	4.8	19	5	14	4.9

* Number of observations

Score sheet for comparing imitations

Number checked by panelists on scale are averaged to get ratings in table (left)



Dairymen Sift Problems, Scan Latest Techniques

¶ Baffling off-flavor developments . . .¶ New milk products . . . ¶ Cheese, oil, and butter processes—get top accent at Connecticut gathering of ADSA

FE STAFF

SPECIFICALLY HIGHLIGHTED at the 51st Annual Meeting of the American Dairy Science Assn. at the U. of Connecticut, Storrs, were such subjects as control of off-flavors in milk, special dairy products, a simplified short-time cheddar cheese process, hydrogenation of butteroil, and use of synthetic *B*-carotene as a butter color.

Control of Off-Flavors

This subject was considered from two angles—prevention and removal.

Discussing cultural and chemical practices for controlling weeds that cause off-flavors in milk, Dr. R. A. Peters, U. of Conn., suggested four control measures:

1. **Good forage Management.** Forage produced on fields that are adequately limed and fertilized, seeded to recommended grasses and legumes, and properly grazed and cut, seldom have a problem with weedy off-flavors.

2. **Starvation Technique.** If any plant is defoliated long enough it will die due to lack of food reserves. This is a slow process, but repeated clipping will kill a number of weeds.

3. **Cultural Methods** such as fallowing and alternating a sod crop with a tilled row crop.

4. **Chemical Control.** Recommended herbicide for control of most common weeds associated with off-flavors is 2,4-D. However, it has definite limitations, most important one being its serious damage to legumes.

In forage stands containing legumes, safest herbicides are salts of dinitro-ortho secondary butylphenol (DN). A new group of systemic herbicides recently studied in

England, are the 2,4-D and MCP equivalents of phenylbutyric acid. These exhibit activity only if a specific enzymatic reaction occurs within the plant. And alfalfa does not carry out the reaction.

Hydrolytic Rancidity

Rancidity in milk was attributed to enzymatic hydrolysis of the fat with formation of free fatty acids, mono- and diglycerides, and possibly free glycerine by Dr. B. L. Herrington, Cornell U.

It is characterized by a rancid odor, particularly when the sample is hot, a bitter taste, and a puckering sensation in the mouth.

The responsible enzyme, lipase, is present in all mixed raw milk. It can be inactivated sufficiently by pasteurization to prevent rancidity in market milk and cream. For storage cream, however, higher temperatures must be used.

If milk is drawn from the udder and held warm, the lipase remains relatively inactive. But when the milk is cooled its action is accelerated. This action is greatly speeded if the milk is again warmed to about 85F. and recooled.

Another factor contributing to lipase activity is breaking up of fat particles. This suggests that the globule membrane plays an important role in protecting fat from lipase. Outstanding example of this action is the rancidity induced by homogenization of raw milk.

Similar effects have been observed with milk handled in pipeline milkers with vertical risers. Here, the milk is subjected to violent agitation by the large volume of air passing through the line. This produces foaming and greatly increases the number of very small fat globules.

On the other hand, pipeline milkers without vertical risers, farm tanks in which warm milk is added to the cooled product, and pumping without production of foam have shown no evidence of accelerating development of rancidity.

Removing Taste Culprits

Use of the Vacreator for removal of off-flavors in milk was described by C. F. Weinreich, Cherry-Burrell Corp., Chicago.

In this unit (see FE Mar., p. 74) milk is mixed with steam in the pasteurizing chamber, then mixture moves at high speed into first vacuum chamber. Here, mixture boils vigorously and gives off part of the water vapor added as steam. This vapor carries with it oxygen and off-flavor containing volatile substances. Milk then moves to second vacuum chamber (operated at lower pressure than first) where it loses more water vapor and volatile substances.

Amount of steam mixed with milk in pasteurizing chamber is more than needed to heat it to pasteurizing temperature. This excess aids in freeing and carrying away flavors imparted by feeds and weeds.

Special Dairy Products

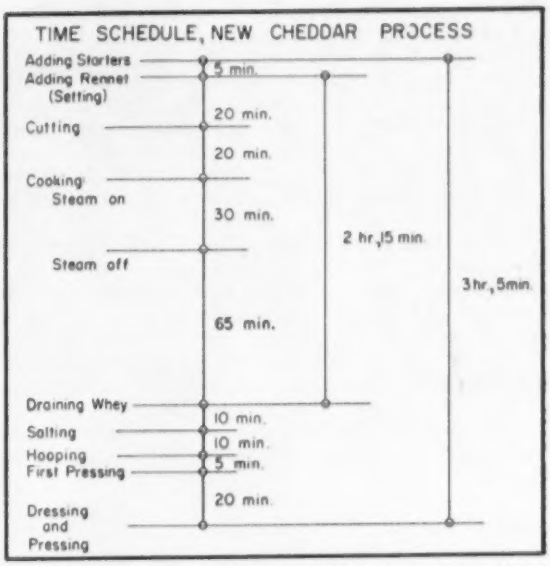
Fruit and other flavored milks are gaining wide popularity in some sections of the country according to A. C. Fay, H. P. Hood & Sons, Boston.

But with few exceptions, none has enjoyed the popularity or the continued public acceptance of chocolate flavored milk beverages.

In attempting to blend any given flavor with milk, consideration must be given to the factors that affect the processing and, also, to the probable consumer acceptance.

The high acidity of certain fruit juices or pulp may destabilize the proteins of the milk sufficiently to preclude the thermal exposures employed in pasteurization. In some instances this is circumvented by pasteurizing the milk and flavoring material separately followed by blending the cold liquids. This not only complicates the production, thereby increasing costs, but provides one more chance for post-pasteurization contamination.

Whether the fruit juice is pasteurized separately or with the milk, there may be considerable loss of the fine, delicate flavors associated with the particular fruit. The problem of capturing these highly volatile constituents and incorporating them in the milk has been a challenge to food technologists.



HOW new method halves cheesemaking time. (See p. 194.)

Capturing Fruit Flavors

Availability of high vacuum concentrates, fortified with the highly volatile essences recovered by the EURL method, could be the answer to this problem. These products make possible the flavoring of milk with true fruit flavors some of which are difficult, if not impossible, to process in a pasteurized product.

Flavors available include cherry, loganberry, black and red raspberry, strawberry, grape, peach, cranberry, blackberry, apricot, pineapple and black currant. Blends of certain flavors such as black raspberry (60%) and red raspberry (40%) are recommended. These are used by adding 4-5 oz. of concentrate to 1-gal. simple syrup, then mixing syrup with milk.

Another practical problem confronting a plant operator is that of dilution. Although milk is characterized by a bland taste, the mild flavors of certain fruits do not come through because of the high dilution factor. It is conceivable that the above mentioned true fruit essences may open possibilities for use of flavors not presently in favor.

Dr. Fay listed a number of flavored milks that have been tried in various markets, giving some formulas.

Coconut milk is prepared from defibrinated powder containing 25% fat. Add at rate of 1 lb. to 1 gal. skim milk, homogenize at 2,000 psi., and pasteurize.

Papaya milk is made from a puree which is added at the rate of 23% by weight to milk. Homogenize at 2,000 psi. and pasteurize.

Vanilla milk. To 1 gal. simple syrup add 2 oz. vanilla.

Add syrup to milk at rate of 25% by volume and pasteurize.

Coffee milk is commonly made by adding a concentrated extract, available from dairy supply houses, to simple syrup (7 oz./gal.) and adding this to milk (15-20% by volume) before pasteurizing. Sugar content varies according to local demands but is commonly 5-10%. Some dairies add the coffee directly at a rate of about 2½%, then add the sugar. In Providence, R. I., sales of coffee flavored milk regularly vie with chocolate milk for popularity.

Mocha milk is commonly prepared by blending equal volumes of coffee milk and chocolate milk.

Strawberry milk may be flavored with the juice drained from 4:1 or 3:1 frozen berries when these are thawed for use in ice cream. Quantity of juice will vary somewhat but will range between 10 and 20% by volume. Ordinarily the sugar in the juice is adequate to give desired sweetness.

Some dealers pasteurize the milk-juice blend by the HTST method, while others use the vat method. Latter tends to drive off some of the delicate flavors of the berries.

Fruit Buttermilk, Too

In cases where the high acid of fruits interferes with their incorporation into milk these flavors may be incorporated in buttermilk. Tomato juice is blended with equal quantities of cold buttermilk, and a similar blend with pineapple juice has been favorably received in some markets.

Pectinized Milk. Within recent months a new proposal (by Dutch workers) is to add pectin enzyme to milk as a means of stabilizing the proteins, thereby enabling use of high acid fruit flavors. The Dairy Industry Dept. at Cornell U. is evaluating the process.

Chocolate Milk

Three methods of preparing chocolate milk were discussed by Dr. W. S. Mueller, U. of Mass. These are:

1. Add dry ingredients to milk followed by heating to dissolve and pasteurize. Here, the heat employed must be suited to the stabilizing agent involved.

2. Add prepared syrup to milk followed by pasteurizing. Again, temperature of pasteurization must be suited to ingredients in syrup.

3. Add prepared syrup to cold pasteurized milk. This method is subject to the following faults: (1) High bacteria counts; (2) product will form cream layer and sediment unless milk has been homogenized or heated to a high temperature (160-65F. for 30 min.), and (3) variations in uniformity.

In preparing the product with a HTST pasteurizer, a chocolate syrup is made and thoroughly mixed with the milk. Mixture is heated to 175F. then goes to a 2-stage homogenizer employing pressures of 500 psi. in each stage, and returns to holder tube of HTST unit. From here it goes through the regeneration and cooling sections, or to a surface cooler where temperature is reduced to 40F. or lower.

The following are important in production of a high quality drink:

Flavor. Use clean flavor, high quality milk, 5% sugar, 0.1% salt. Keep viscosity as low as possible without obtaining sedimentation.

Appearance. Sedimentation is undesirable and can be prevented by: Stabilization or using flavoring material from which cocoa fiber has been removed. Objection to latter method is that product gives reduced flavor and color.

A cream layer holds fiber particles giving an uneven, dirty looking color. With the special flavor mentioned above, color is more normal. Wheying off may be due to use of milk with high acidity, or improper use of stabilizers.

Sweet, High-Fat Products

Basic principles that must be applied to production of an acceptable sweet cream product were enumerated by G. A. Houran, DeLaval Separator Co., Poughkeepsie, N. Y. These are:

1. Start with clean, unchurned milk of low-developed acidity.

2. Separate in an enclosed unit at the lowest practical temperature, and allow cream to flow directly to the pasteurizing vat or balance tank of HTST unit.

3. Pasteurize at 150-55F. for 30 min. in vat, or 170-75F. for 16 sec. by HTST, then cool quickly to 40F. and bottle. Age bottled product 24 hr. in cold room. Standardization should be with skim or homogenized milk.

If a cream of exceptional viscosity is desired, cold raw milk should be separated to give a product of high fat content. Then enough hot milk is separated to produce skim which is used for standardization.

The following suggestions were given for improving creams of various fat content:

Light (18-22%) cream and half-and-half are usually homogenized at 250-1,250 psi. with 2-stage unit to give better fat dispersion and reduce feathering. Another feathering control measure is addition of 2-6 oz. sodium citrate per 1,000 lb. cream before homogenization.

Many plants add 4-5% low-heat skim milk powder to half-and-half. And addition of 6% solids-not-fat to whipping cream aids whipping properties and improves stability.

Cottage Cheese

Fourteen factors involved in the manufacture of uniform, high quality cottage cheese were discussed by N. C. Angevine, Meyer-Blanke & Co., St. Louis. They are:

1. Quality of milk. Only fresh milk of low bacterial count, graded for off-flavors, checked for antibiotics, and held below 40F. should be used.

2. Solids content of the skim should be 9.0–9.5%, and when below 9% should always be fortified with a good low-heat powder either before or after pasteurization.

3. Proper pasteurization. Time and temperature relationship should be sufficient to give a negative phosphatase test with a reasonable margin of safety, but over-pasteurization should be avoided. Suggested maximums are:

Vat method: 144F. for 30 min.

HTST: 161½ for 15-18 sec.

Vacreator: 185F. for 2⅔+ sec.

4. Culture control. Cultures must produce acid and desired flavor, be free of bacteriophage, able to overcome some chemicals, antibiotics, and phage that may survive pasteurization. They must be dependable.

5. Type and size curd. Most cheese is made by cutting curd with horizontal and vertical knives into ¼, ½, and ⅝-in. cubes. Variations must be made in amount of coagulating agent and cutting acid between different size curds. Also; solids-not-fat in skim should range from 9.5-10.5% when curd is cut in ¼ in. cubes, and 10.5-12.0% when it is cut ⅜ in.

6. Manufacturing methods. Three methods are used;

a. Short—90 deg. setting temperature, 5-6% starter, 4½-5½ hr. setting time.

b. Modified–80-83F. setting temperature, 2½-3½% starter, 7-10 hr. ripening time.

c. Long or overnight—70-72F. setting, 1-2% starter, 11-16 hr. ripening.

7. Holding after starter is added. Addition of fresh starter 2-2½ hr. after original starter helps combat anti-

(Turn to page 89)

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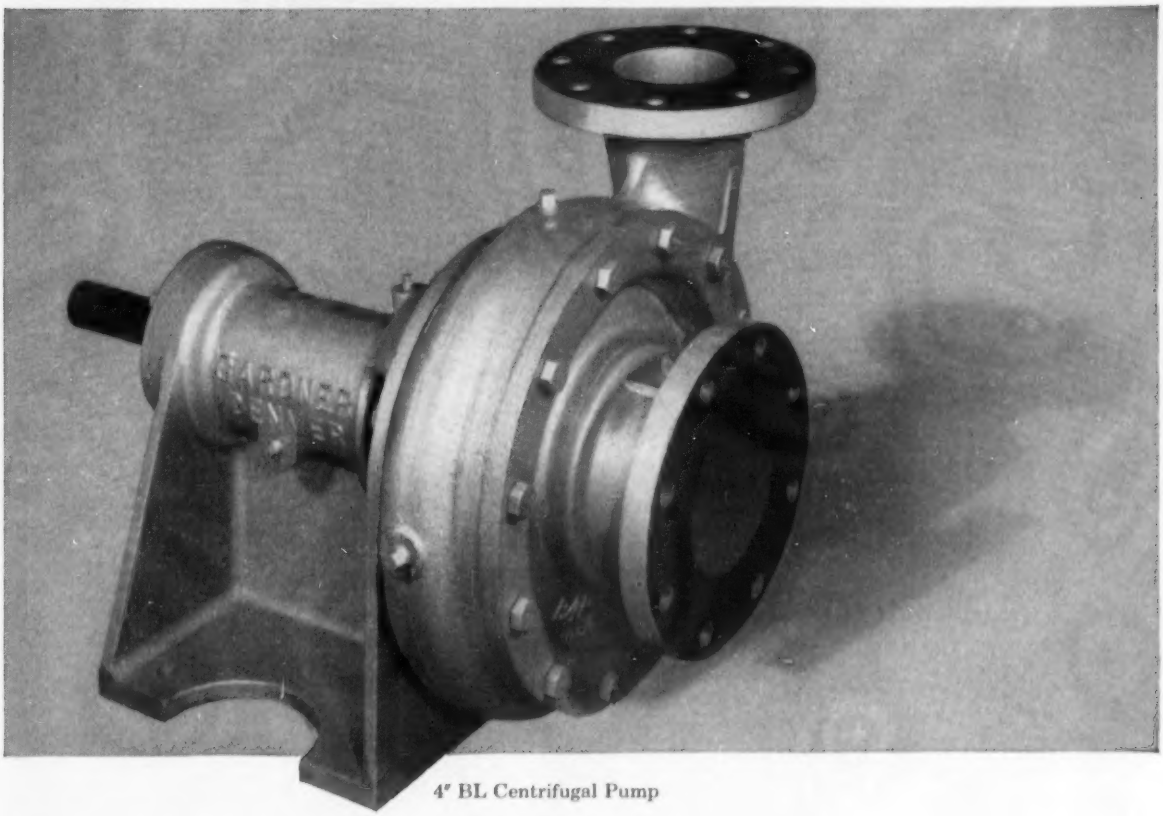


4" BL Centrifugal Pump

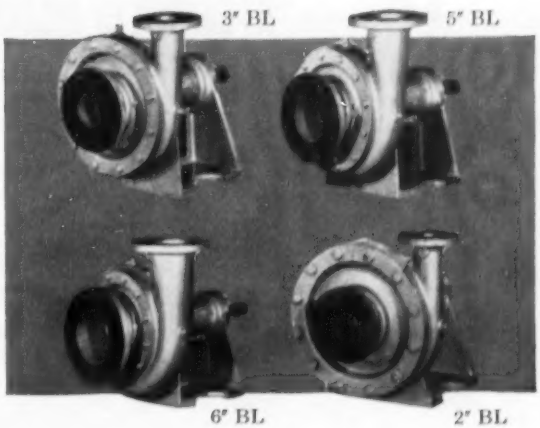
New Gardner-Denver BL Pumps

. . . stay efficient even when volume on head fluctuates

HERE'S NEWS FOR PUMP ENGINEERS: These new Gardner-Denver Centrifugal Pumps are designed to deliver peak performance over broader ranges of service conditions. BL pumps take variations—either in the head or water volume.

Each size (there are five to choose from) handles a wider-than-usual range of pressures and capacities.

Each has heavy-duty ball bearings, factory lubricated . . . extra large shaft to assure continual alignment . . . strong supporting frame . . . a trouble-free mechanical seal. Bulletin A-8 gives all the facts.



GARDNER - DENVER

THE QUALITY LEADER IN COMPRESSORS, PUMPS, ROCK DRILLS AND AIR TOOLS FOR CONSTRUCTION, MINING, PETROLEUM AND GENERAL INDUSTRY

Gardner-Denver Company, Quincy, Illinois
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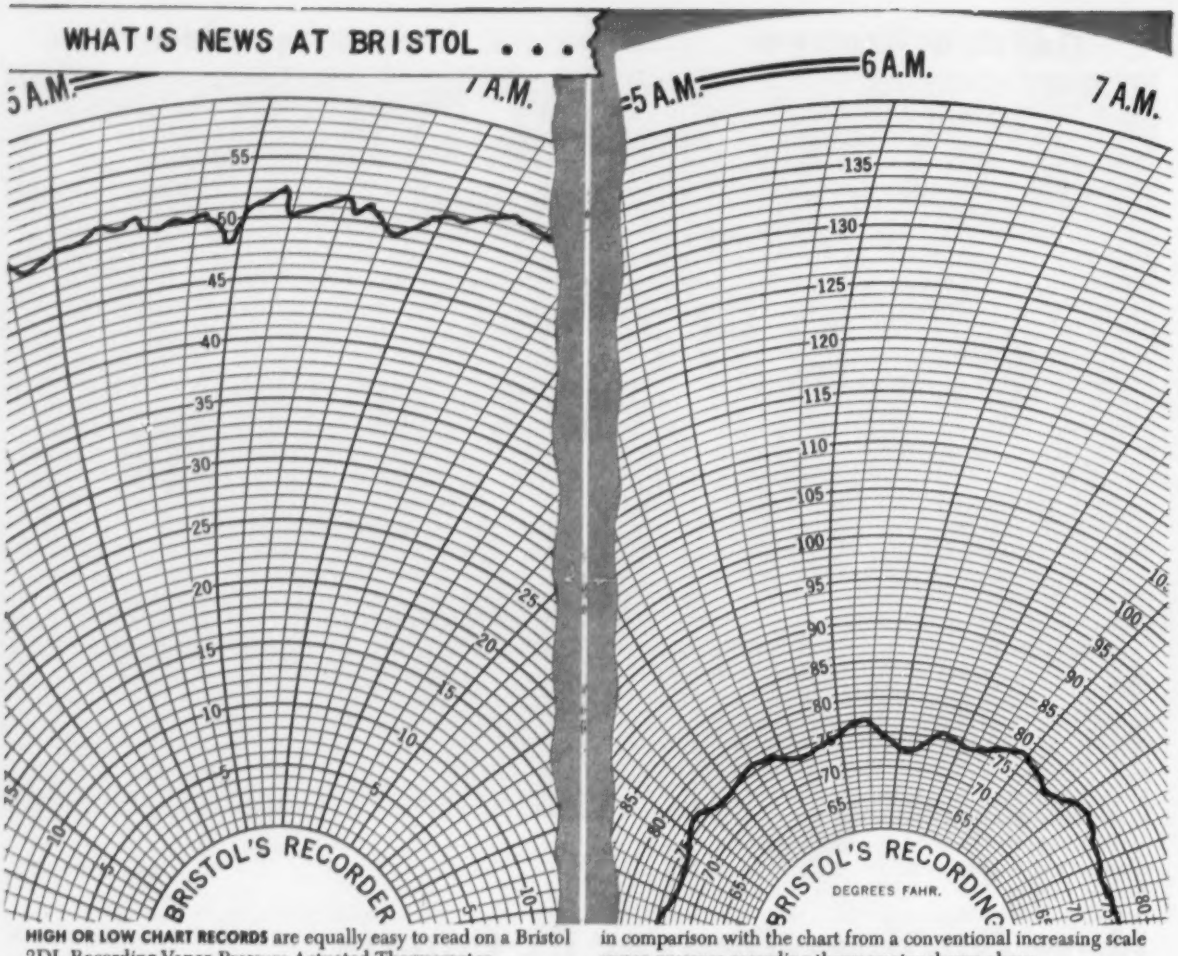
For more data, circle this page number on card at front →



HIGH OR LOW CHART RECORDS are equally easy to read on a Bristol 2DL Recording Vapor-Pressure Actuated Thermometer . . . in comparison with the chart from a conventional increasing scale vapor-pressure recording thermometer shown above.

Bristol leads with linear scale vapor-pressure actuated recording thermometer

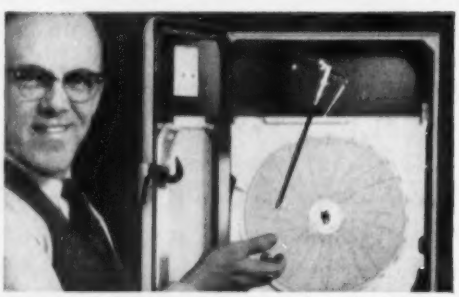
Tagged by instrument men as "the greatest advance in 25 years of recording thermometer building," Bristol's 2DL vapor-pressure actuated recording thermometer has a uniform linear scale that's equally easy to read at any point in its range.

It's another example of Bristol's "Human-Engineering" that means greater operating convenience, fewer errors, and easy visual interpolation.

MORE GOOD NEWS! In addition to this new high in readability throughout the entire measured range, Bristol has eliminated ambient temperature effects to boost the inherent accuracy of the recording thermometer still further.

GET ALL THE FACTS about these rugged precision instruments. Write today for free 48-page Bulletin T840 – it tells all about typical installations, ranges, charts, bulbs, and tubing. The Bristol Company, 115 Bristol Road, Waterbury 20, Conn.

5.20



HIGH-SPEED RESPONSE AND ACCURACY are key advantages of the new Bristol Vapor Pressure Recording Thermometers.

BRISTOL

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BRISTOL'S

AUTOMATIC CONTROLLING, RECORDING AND TELEMETERING INSTRUMENTS

biotics, chemicals, sanitizers and phage troubles.

With the short method there should be an increase of .05 in acid after 1½ hr. with skim of 9% snf., .06% with 10% snf. For each .01% short on acidity, add 1% starter.

Between 1½-2 hr. there should be another .04% increase, followed by a further increase of 0.6% in the next 30 min.

8. Coagulating agent. It may be necessary to vary the amount of agent as cultures vary from day to day. Care should be taken not to over coagulate.

9. Cutting acidity. Low acid cheese should be cut at the isoelectric point of casein. A practical rule is to cut ⅜ in. curd at 0.51% acid when solids are 9%, and subtract .02% for each ¼% solid below 9%, add .02% for each 1% above 9.

10. Cooking Curd. Cooking should be slow in the early stages and gradually increased as acid increases. Time for the short method should be 1-1½ hr., modified method, 30 min. longer, and long method 1 hr. longer.

A temperature of 120F. should be reached to kill as many starter organisms as possible. This temperature should be maintained for 20 min. or more.

11. Washing curd. There must be three washes, all with water that has been acidified to pH 6.0-7.5, chlorinated with 5 ppm. Cl if held 3-5 min., or 10 ppm. if held 1-2 min., and filtered if needed.

First wash should be at 80-85F., second at 55-60F., and last at 40F. to get temperatures of curd below 45F.

12. Preparing dressing. The cream should be fortified with solids-not-fat, heated to 165F. for 30 min. with salt

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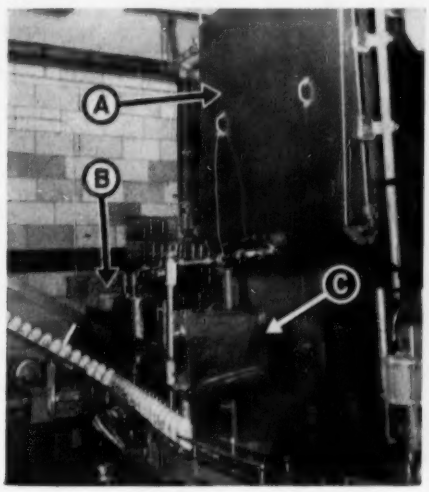
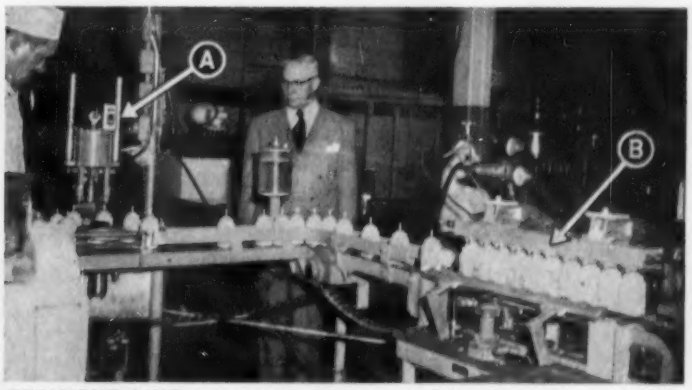




EFFICIENT LINE turns out pressure-canned topping cream at 1,680-can-per-hr. **Left photo:** Cooling unit (A) supplies cream to automatic filler (B). Empty cans are filled, then get dispenser valves from rack (C). **Above:** Single-spindle crimper (A) forces gas-tight valves into the cans, which finally move to combination gassing-shaking machine (B).

Pressurized Topping—At 1,680 Cans/Hr.

FE STAFF

HIGH-SPEED OPERATION characterizes packaging of pressurized topping cream at Brook Hill Farms, Inc., Chicago dairy firm.

The product is put up in two sizes under two brand names: Reddi-Wip, 7 oz. of topping in a 13-oz. can; and Fount-Whip, 13 oz. in a 19-oz. stainless steel container.

Both units use nitrous oxide as propellant. The 13-oz. retail can is under a pressure of 125 psi., while the 19 oz. is under 200 psi. for the ice cream and soda fountain trade.

The manufacture of Reddi-Wip serves to illustrate. This fully automatic line operates at a 1,680-can-per-hr. clip. First, cream is cooled to 40F. in a water-chilled transfer cooler. It next proceeds to a filler bowl supplying a 2-spout, stainless steel, filling unit (Mojonnier-Dawson).

Meanwhile, empty cans are fed onto an inclined, rack-type chute. They are, then automatically transferred onto a flat-top chain conveyor that is equipped with upright metal pegs to space out the cans as they move to the precision filler. A pre-set graduated dial adjusts filler's timer to deliver desired volume of cream into the cans, two at a time.

Precise fill is obtained by maintaining a constant level of cream in the supply tank, and by controlling opening time of filling-nozzle valves.

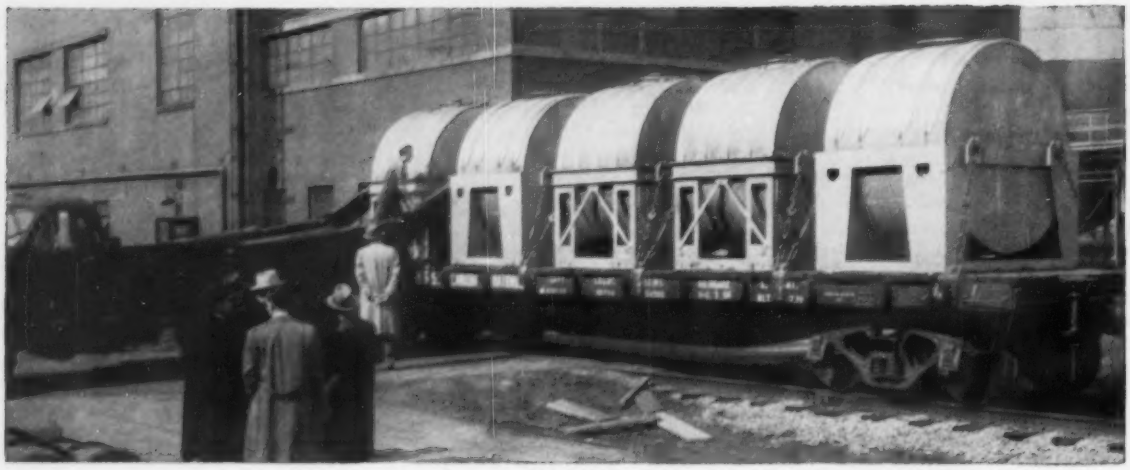
Electronics Play Role

As cans index beneath nozzles, a cam actuates a "no can, no fill" Microswitch (hooked to timer). This transmits a current to a solenoid coil on the timer, to lift nozzle valves for the desired time.

As cans leave filler, dispensing valves with gas-tight rubber gaskets are inserted into them from a chlorinated, stainless rack. A starwheel spaces and feeds the cans into a rotary, single-spindle machine that crimps gaskets into the cans.

Containers are then conveyed to an automatic, 10-can gassing and shaking machine. Here, nitrous oxide is charged into each can from a cylinder.

After a 12-sec. shake, cans are case-packed. And product is finally dry-cooled in a 32-deg. room.



'SECTIONAL TANKER' is ready to roll as mechanical loader spots fifth oil container on flat car at Lever Bros., Toronto. Projected here is a permanent facility permitting direct filling of huge drums without removal from cars.

CLOSEUP of hydraulic-lift truck. Such equipment currently speeds deliveries at both ends of runs.

Big Permanent-Cradle Tanks Slash Labor, Expense in Moving Liquids

Hooking directly to production lines, they simplify handling and storing, also take headaches out of inventory. Units incorporate steam melt-out coils, are easily cleaned

MIKE GUTWILLIG
McGraw-Hill Correspondent, Montreal

NEW IN BULK TRANSPORT are the special aluminum liquid containers recently put on the road by Lever Bros. Ltd., Toronto. In fact, they're so new that they haven't yet been given a name.

These containers readily group on a flat car to form a "five-section tanker" (see photo) for moving refined and blended vegetable oils to the company's margarine plant—Newfoundland Margarine Ltd., St. John's, Newfoundland.

Measuring 8 ft. 11 in. in height (including filling dome and steel cradle), each new drum holds 12,000 lb. of vegetable oil.

▶ **Moreover, other liquid foods could very well be handled in them—such as sugar, chocolate, shortening, and vinegar.**

Several flat cars are already operating with the containers. And Lever Bros. and Canadian National Railways aim to get them rolling on a 50-weeks-a-year schedule. A full program of 3 cars a week out of Toronto calls for about 30 containers and requires 10 specially equipped cars on the mainland and 6 such cars in Newfoundland.

• **"Handling is simplified** by this innovation," says M. J. Rae, Lever's manager of transportation and supply, "since the old method required

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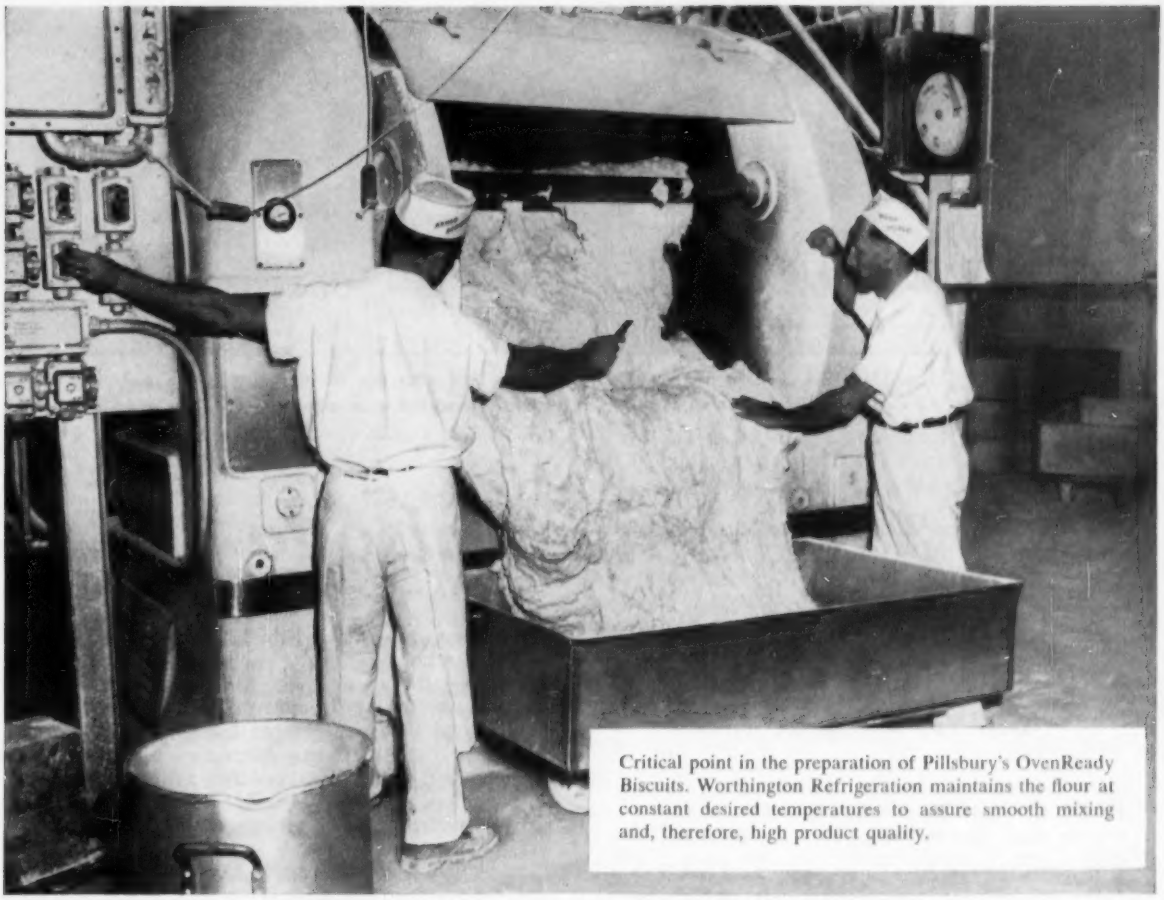


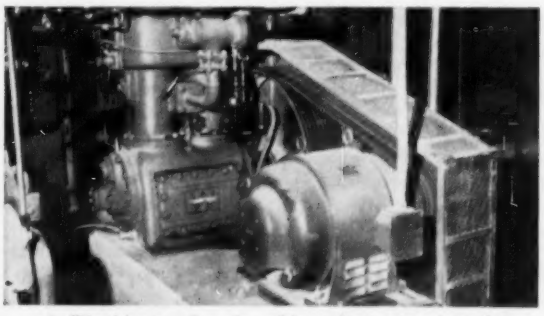
Critical point in the preparation of Pillsbury's OvenReady Biscuits. Worthington Refrigeration maintains the flour at constant desired temperatures to assure smooth mixing and, therefore, high product quality.

Biscuit dough: quality control demands temperature control

In the preparation of OvenReady Biscuits, Pillsbury Mills finds that high quality calls for careful control of temperature in all stages of preparation.

Flour must be carefully chilled for smooth, even mixing. The dough must be kept at exactly the right temperature for preparation and packaging. And during storage and shipment, the finished product is always well refrigerated.

For a major share of this important quality-control job, Pillsbury depends on Worthington refrigeration equipment.



A Worthington 2-cycle refrigeration compressor in Pillsbury's Downingtown, Pa., plant.

Three Refrigerated Foods plants—at Los Angeles, Downingtown, Pa., and Louisville—are equipped with Worthington ammonia compressors. These units feature automatic capacity control which assures economical operation.

In addition to ammonia compressors, the Los Angeles and Downingtown plants use Worthington brine pumps, product coolers and air handling units.

At the Louisville plant, a Worthington evaporative condenser cuts water consumption of the system as much as 90%.

In any food plant quality control starts with temperature control. If you have a QC problem that requires refrigeration, get in touch with your nearest Worthington District Office or distributor. Or write to Section A6104, Worthington Corporation, Harrison, N. J. In Canada: Worthington (Canada) 1955, Ltd., Toronto, Ont. A-6104

WORTHINGTON

Tom lifted his arms in disconsolate supplication. "I offer this training gratis," he declared. "But our men certainly haven't swamped me with requests for it."

Ole Sage Episode

FOREMAN-TIMBER WORKERS: Where Should You Seek Them? And How Can You Recognize Them?

IVAN C. MILLER
Associate Editor, "Food Engineering"

I'M TELLING YOU—I had my ears pinned back a bit this morning by a question from one of our foremen."

The speaker was Tom Watson, personnel manager of Y&G Specialty Foods Co., and his statement drew an interested "How was that?" from Luke Markham, Colossal Candy Co. superintendent, who was sitting next to him at the luncheon of the Guff & Gripers.

Tom drained the last of his soup, then said: "At Y&G we're offering our foreman some very worthwhile training opportunities—all for free, and voluntary. Nothing crammed down their throats. Those who want it just have to be interested enough to ask."

"That's the way it should be," agreed Luke. "But what was this ear-pinning?"

"I'm coming to that," said Tom. "You see, as personnel man, I'm the one they're to see on the training. And, as I say, I offer it gratis. But," he added, lifting his arms in disconsolate supplication, "the men certainly haven't swamped me with requests for it.

"Anyhow, I happened to ask our foreman, Bill Farrell, if he'd be interested in any of the study courses. And here's what he set me back with: He said, *'Give me just one good reason why, at my age, I should spend my nights studying?*

"Wise guy!" blared Batt Bulwark, works manager of Mull & Mull. "That's the kind of foreman I'd like to bust to the ranks." He paused, then reflected, "Even though he may be right."

"No, Batt," resumed Tom, "Bill's not a wise guy. He's level-headed, and meant what he said."

"Well, just what did you tell him," asked Luke. "And were you able to bring him around?"

"There wasn't time to answer him," replied Tom. "He was called away just at that moment."

Tom looked around the table, a bit sheepishly. "Matter of fact, I'm not sure I know enough of the answers to be convincing, so I'm suggesting this as a subject for one of our meetings, say the next one."

"I second that," encouraged Luke, "and by the way, why don't you bring along Foreman Farrell? Might do us all good to know what he thinks, and why."

As others nodded agreement, Luke added, "And maybe another foreman's views might help, too. I've got a fellow I'm interested in—Dick Duwell. I once brought here, you'll remember. Has a promising future—if I can only get him steamed up to it. Okay if I bring him?"

As assent was evident, Barney Hasbrook, industrial relations manager of Holstein Dairy Products, then cut in: "All right, that's it for next time—so now let's get on the road with today's subject—How do you go about finding people to hire that'll start in the plant as workers and end up in management? What kind do you look for? How and where do you locate 'em? And how can you get some idea how they'll work out in management?"

"First, last, and all the time, give me someone with a strong back!" Batt bellowed, to be sure he'd be heard by everyone.

"You forget, Batt," spoke up Barney, "that the problem we're considering relates to hiring those who can, and those who will, climb in management, even though they start in the ranks. It's *brain power* that is needed in that kind, not *horsepower*."

"When I say 'strong back', I don't mean muscle-bound," snapped back Batt. "What I mean is stamina. I say it's bad enough to have some puny ones in the work force. Regularly, they get sick and don't show up. So they gum the works. And that affects the others, too."

Batt leaned over to thrust the end of his stogie in the flame of Barney's lighter, then explaned further: "Sure, a foreman has got to have brain power. But he won't have much chance to use it if he doesn't have real backbone. Health and guts—that's what I want in my foremen!"

Ole Sage now contributed: "Batt does have a point. Vitality is a necessary requirement in those who intend to meet the responsibility of industrial management—at any level."

"When I was a foreman," Luke Markham interjected,

"I did most of the hiring of those under me, at least during my first years. What I looked for then was experience."

"Old timers," broke in Personnel Manager Milt Sorensen with a smile, "are what everyone wants—old-timers with lots of experience, age limit 25!"

When the chuckles subsided, Luke admitted that experience wasn't everything. "Later on", he said, "I looked for the special kind who seemed definitely ready to learn, whether or not they had any experience. When I was lucky enough to choose right, it didn't take them long to acquire what was needed. And this was experience on our own specific jobs—far better than experience elsewhere."

"As I gather, then," summarized Barney, "experience may be helpful, but not absolutely necessary. Health, however, is a must, also the capacity for learning.

"So I suppose if you're hoping to pick a future top-kick, then you snoop around for Ph.D's. But you compromise with high school or even grade diplomas for those you pray will make reliable future foremen."

"For gosh sake, stay on the track!" groaned Batt. "We're not hiring presidents today. We'll be more than lucky if we get even the haziest light on how to pick a worker that can be made into a good foreman. And what I want to know is how to get these brain-power future-foreman guys flowing your way. They don't come pounding on your gate begging for a shovel to get started."

Ole laughed with the rest, then suggested: "Let's finish the points on *what* to look for in hiring. Then we can take up *where* to look. As you all know there's lots to learn before a worker can make the transition to foreman. And that's not all. From then on, if he's efficient and successful, the foreman never stops learning."

Ole went on: "Completion of high school is fair proof of ability to learn. On the other hand, some have the ability though they've not had the chance for formal education. Usually however, their records point them out. And you generally spot them during an interview.

"Those of you who've had hiring experience will agree, I think, that one great weakness in our present selection of employees is the lack of complete records—and I mean detailed records from the time they were toddlers to the day of hiring."

"You're being a *visionary*," boomed Batt, "Get off your magic carpet and come down to earth!"

"Right, Batt," admitted Ole. "To hope for such applicant histories is visionary. However, to the extent we can explore even a part of the applicant's past we are that much aided. To a vital degree, each man is the result of what he has done. Each of us reflects today and tomorrow his accomplishments of every yesterday."

Noisily Batt chewed the end from another stogie, then blasted: "Those remarks are likely pointed at me. You'd 'read' me as being hard because I came up the hard way."

Ole's eyes twinkled. "Anyhow, with a look at complete records, we could readily spot evidence of the most basic foreman requirement—leadership. And as all of you must realize, this most essential qualification is also the most difficult to judge—in fact, even to define."

"That gives me an idea," mused Barney. "It might pay for anyone in command to do a bit of exploring into the past of those under them."

"**But,**" injected Luke, "can't we move on to how to bring in these potential foremen? Give us the low-down, Ole."

"Time's short," resumed Ole, "not enough left for more than high spotting."

"I like it fast," encouraged Batt. Short and no detours. Shoot!"

"First of all," Ole pointed out, "a thorough study of the personnel of most of our own organizations would disclose unrecognized capabilities. In fact, I'd guess most of you now have an eye on someone you hope will come through."

"It seems to me," lamented Batt, "that whenever we find a shop foreman who's good timber, it develops that the union found him first and has already made him a steward."

"There are angles," Ole commented, "to what Batt says. Unions are often looked at as just sources of general labor. However, we should never overlook the fact that many a union steward and other trained worker has climbed high in management."

Ole sped on: "High on the scale in locating talent are your own employees. If they're happy, and if they like the working conditions and believe it's a good company, well managed—then you can be sure they'll tell their friends and relatives, and even suggest to them the possibilities of getting a job at their place.

"So it would seem wise to tell your own personnel when your company needs more employees, and to ask them to tell their friends.

"Sure," went on Ole, "Some people object to this method, pointing out that turndowns of unwanted applicants may result in employees being disgruntled over the 'treatment of their friends'. Also there is the probability that these friends will only be at the worker's level of ability, or on a lower level, and therefore won't be foremen timber. Management, these people say, should exclusively handle the scouting for foremen timber.

"Suppose, then, you compete for the recent college graduates to supply technical or special needs. True, this can be expensive, maybe too rich for your company's blood. But surely your outfit can afford to look over the best that the local high schools or trade schools turn out. You can enter your bid for the cream of them."

At this, Milt Sorensen said, "I sure go along, and for this other reason as well: In this way you promote your company in the community, even though you might not draw all the future foremen you need. Yes, I'm always for building best community relations."

Ole now moved to wind up the session by adding, "Further means of procurement include newspaper and other advertising, use of public employment services and private agencies, etc. The last alternative to be attempted, it seems to me, is to raid some other company for foremen talent.

"**Time's up,**" prompted Tom Watson. "And remember that next month we're going to talk about 'why a foreman should, or shouldn't, study."

As the members started to push back their chairs, Ole admonished: "Before you go, I'd like to leave a thought in keeping with Milt's contribution. To the extent you build an enviable corporate reputation, desirable job applicants will flow your way at all levels."

Turn Page for Ole's Notebook →

WORKING FROM A FRESH ANGLE

Over at Y&G, Tom Watson runs into a special problem. And this sparks the Guff & Gripers into planning a "guest day" with the aim of digging up tips on how to upgrade employees who "don't yet see it that way" . . . Then Ole gets in some fast licks (the kind Batt Bulwark likes best) on searching out workers having the most potential for climbing the company ladder.

SPACE SAVER

Extend-A-Forks of Yale Warehouser ready to pick up load at Unity Warehouse, New York City

YALE TRUCKS WITH EXTEND-A-FORKS GIVE MORE STORAGE SPACE

A Yale Warehouser equipped with exclusive Extend-A-Forks will improve your warehousing operation two ways:

First, by stacking heavy loads faster and easier. The Extend-A-Forks actually reach out by hydraulic action ...extend up to a full 30 inches...eliminate the need for straddling bottom stacks. This means the outrigger wheels always remain in the aisle. The operator simply pushes a button and the forks guide the load neatly into position.

Second, by permitting greater use of available storage space. Even in 60" aisles this Yale Warehouser has plenty of room to maneuver. Moreover, it tiers loads 10½ feet high to give you full advantage of 'air rights'.

No wonder Yale Warehousers with Extend-A-Forks have become favorites throughout the food industry. Their stamina, high lift, light weight and easy maneuverability mean savings in time and space for the owner... greater safety and ease of operation for the driver. Available in 2,000 and 3,000 lb. capacities. For complete information about Yale Warehousers equipped with Extend-A-Forks, write The Yale & Towne Manufacturing Co., Philadelphia 15, Pa., Dept 468.

YALE* **INDUSTRIAL LIFT TRUCKS AND HOISTS**

*REG. U. S. PAT. OFF.

Gas, Electric, Diesel & LP-Gas Industrial Trucks • Worksavers • Warehousers • Hand Trucks • Hand and Electric Hoists

From Ole's Notebook

5 Targets for Executives

The general goals in an executive-development program are:

1. The increase of each executive's store of factual knowledge about management in the light of findings of latest research studies in the field.
2. The increase of each executive's supervisory and managerial skill.
3. The increase of each executive's insight and understanding of others.
4. The motivating of each executive to greater productivity in the work situation.
5. The stimulation and growth of a management team concept.—*Michael G. Blandsfield in Mar. '56 "Personnel," of American Management Assn.*

Leadership's Force

The cooperativeness with which people respond to help get a job done tells something about the group's leader.

Also, the work environment itself, can reflect human-relations skill.

Challenge to management is its responsibility for developing leadership through improving human-relations skills.

Success or failure of management leadership can be measured in proportion to the effectiveness of the human relations skills that are practiced throughout the organization. — *Lincoln M. Lenzi, director of training, The Mead Corp., at meeting of National Industrial Conference Board.*

Benefits of Group Attack

There is evidence that group participation is beneficial at all levels in an organization. For example, one of the best ways to have supervisors become aware of the job that needs to be done by their work group, and to have them accept responsibility for it, is to involve them in decisions where the functions and responsibility of their work group are examined and reviewed.—*"Motivation: The Core of Management," a publication of the AMA*

Cause of Failure

No one can expect to advance himself in a big organization unless he knows and practices the vital principles of good human relations.

Inability to get along with people contributes more to failure by executives than lack of specialized knowledge.—*Stanley C. Allyn, President, National Cash Register Co.*

Negotiation "Poker"

When you approach the bargaining table without having your case fully prepared, you invariably dig a deep pitfall for yourself.

It is virtually impossible to spend too much time analyzing, preparing, and reasoning out the information, arguments, and facts involved in a forthcoming negotiation.

On your own side of the case, don't depend on poker-playing bluffs to take the place of strong, conclusive evidence. True, there is plenty of poker playing in most negotiations. But you can always play a better hand if you hold good cards of assembled information.

If you yourself are going to make demands and claims, prepare your case so that you can prove it.—*General Management Series, American Management Assn.*

Re-Aimed Sensory Testing

—*Continued from page 83*

practical standards for natural vs. synthetic comparisons, and in establishing correct goals. These latter are vital. For if the aim is too broad, an unacceptable product will result—if too narrow, a needless perfection is attained that is inside the variations of even natural products.

Thus, the new imitation foods were graded qualitatively by the panel. These men then suggested materials that would provide or modify specific flavor notes. And these were added to supplement the components that had been found in chemical analysis. This was especially necessary, since many flavors derive from extremely complex materials rather than from simple chemical compounds.

An example is the comparison between two natural black peppers and two imitations (Table II). Here, it can be seen that while imitation A has more of the musty, heavy, sweet, sharp, and floral notes than natural product B, nevertheless it does have the correct amount of spiciness, fruitiness, and camphor.

In addition to guiding formulation, expert panels are useful in comparing and selecting production methods. Often flavors of products made by different methods of mixing, distilling, grinding, etc., vary appreciably.

In practice, our panels were even able to define important differences within production cycles, such as distillations and heat treatments.

Synthetics Compared

After production methods are chosen, sensory panels can be used to check synthetics by making direct comparisons with natural standards.

In our case, judges were requested to rate samples quantitatively—identifying coded samples as either natural or synthetic. Then they were asked to rate each sample on another 9-point scale. This ranged from "just like natural product" (0) to "not at all like natural product" (8).

Both trained and novice panels were used in these final tests (see Table III). The figures show that novices were less certain of the odor from natural black pepper, hence scoring was more liberal. But imitations were rated similarly by both the trained and inexperienced groups.

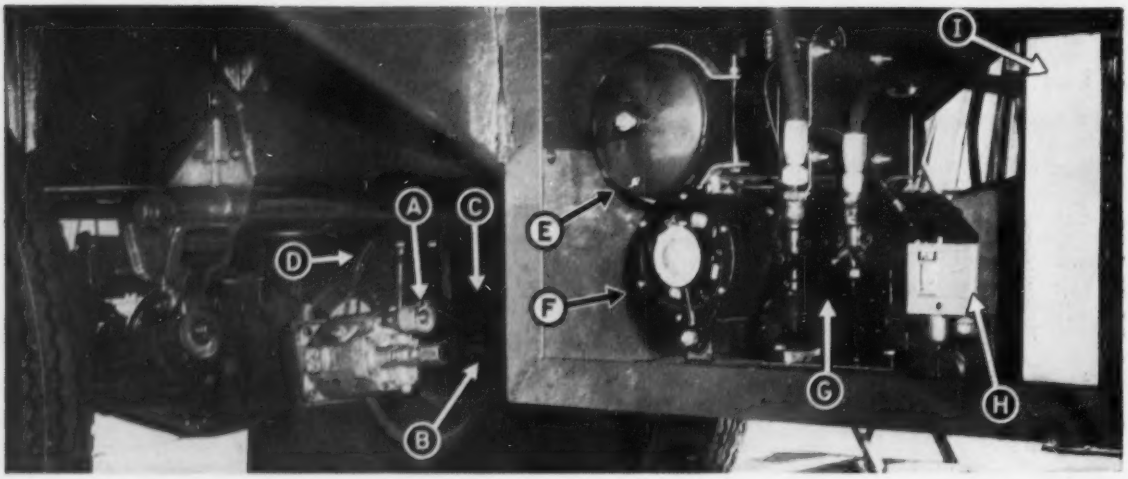
Also revealed is the fact that none of the imitations scored as low as the natural black peppers on odor.

Experiments performed in Evans Research & Development Corp. labs were checked by the Quartermaster Food & Container Institute, Chicago. And although procedures varied slightly in some instances, findings were similar. This is a good indication that methods used were valid.

These panel methods have been applied—to a limited extent—in taste testing, too. However, in many cases fewer samples can be run in the same period of time, particularly if the product has secondary effects, such as pungency or astringency.

And because this time-lag in sampling can effect the panelist's flavor memory, it is helpful to give him characteristic reference samples with each unknown. These paired comparisons, combined with the rating chart of flavor characteristics, sharpen accuracy during evaluations.

End *(Resume reading on page 84)*



FOCUS ON NEW rear-axle, hydraulic-unit, trailer-refrigeration system. Seen (left) is hydraulic pump on axle. Here, (A) is solenoid, (B) high-pressure line to motor, (C) gravity line feeding hydraulic fluid from reservoir to pump and (D) relief line returning excess fluid to reservoir. Then in carrier compartment (right) are (E) hydraulic-fluid reservoir, (F) generator that charges battery for running fans, (G) compressor, with "in" line right, "out" line left, (H) temperature-responsive control activating solenoid that turns hydraulic pump on and off to maintain even temperature, and (I) condenser. (See drawing below for unit plan of compartment.)

Trailers Now Refrigerated By Rear-Axle Hydraulic Units

Coast food company sees new system bringing notable cost savings, easier maintenance, and more uniform performance

JOHN SHINN
McGraw-Hill News Bureau, Los Angeles

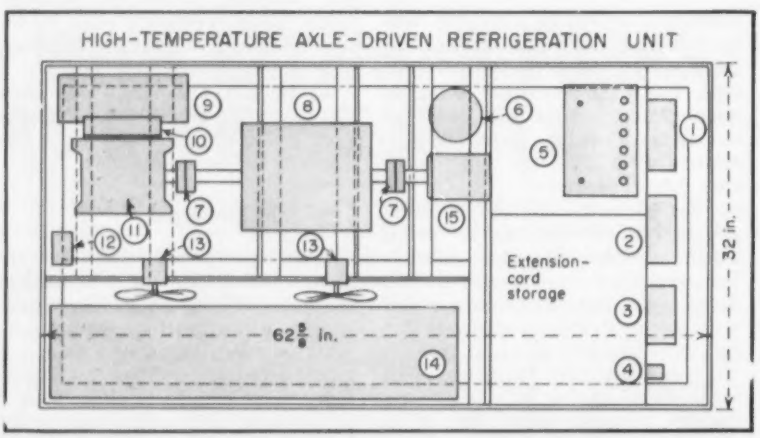
THROUGH USE of an efficient hydraulic system, several Carnation Co. trailers are getting their "over-the-road" refrigeration by power derived from the vehicles' rear axles.

▶ **The company expects this equipment to clinch annual savings running from $650 to $800 per unit.**

▶ **Seen further are simpler operation, a more favorable weight factor, improved accessibility, and generally augmented reliability.**

Designed and built by Aluminum Body Corp., Montebello, Calif., the axle power takeoff eliminates gasoline motors with their attendant maintenance and fuel costs. Further, the hydraulic operation does away with transmission belting, gears, pulleys, etc., encountered in other systems that get power from truck or trailer axle or driveshaft.

(*Turn page for continuation*)



CARRIER-COMPARTMENT PLAN shows (1) junction box connecting electrical circuits, (2) control box with automatic switch that activates standby motor when plugged into dock electrical outlet, (3) transformer to reduce 220v. current for standby motor to 110v. for lights in trailer, (4) switch unit, (5) 12v. battery, (6) Freon tank, (7) chain covers, (8) G.E. standby motor, (9) and (10) Auto-Lite generator (55 amp.) and voltage regulator, (11) Copeland 4-A-1 compressor, (12) Penn refrigeration control, (13) 1/20 hp. fan motors, (14) condenser unit, and (15) Sundstrand hydraulic motor.

WHAT'S HAPPENING TO THE "BOOM" IN ARTIFICIALLY SWEETENED BEVERAGES?

Despite heavy promotion, sales of artificially sweetened soft drinks lag while sugar-sweetened beverages soar to new highs

TRENDS IMPORTANT TO FOOD PROCESSORS

How big—actually—is the market for artificially sweetened foods? Should I market such a product or put all my sales efforts behind my established lines? If you are asking yourself these questions, a good look at the trends in soft drink sales may help find the right answers.

Despite the lavish claims, publicity and promotion put behind them, sales of artificially sweetened soft drinks have failed to reach one percent of the volume of the sugar-sweetened kind. They have even failed to keep up with the industry trends. ***Gains** in sales made by sugar-sweetened beverages last year alone were more than ten times the total volume artificially sweetened beverages have reached to date!*

It seems that expensive promotion may scare people into buying a no-calorie or low-calorie product for the first time, but the "thinning" claims are *too thin* to keep them buying.

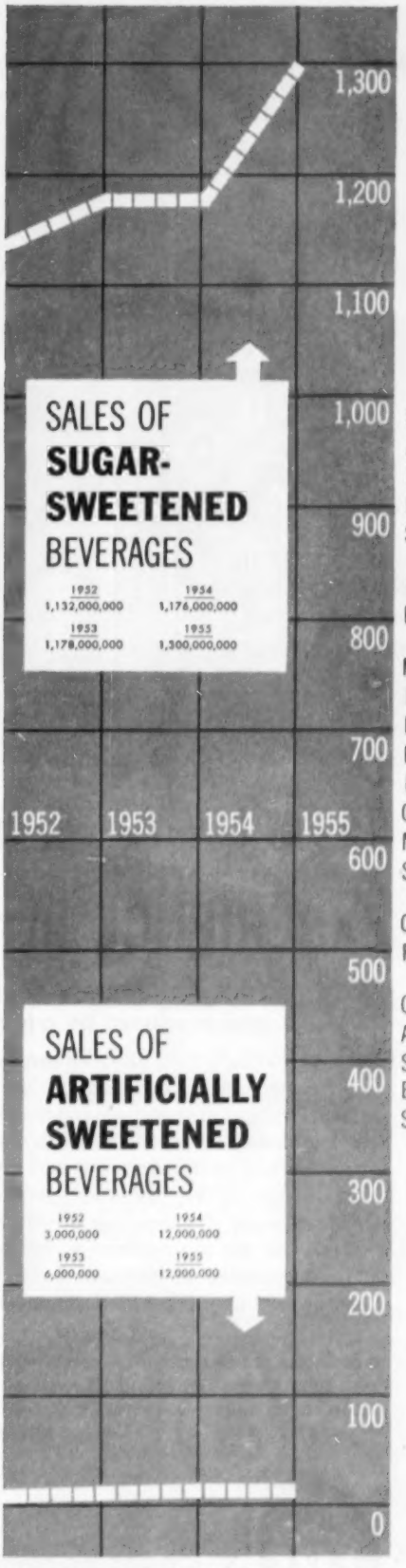
On the other hand, Sugar Information advertising is telling people the facts about sugar—and helping to strengthen their healthy, positive attitudes toward the foods and beverages that contain it.

18 CALORIES

Surprise you that there are only 18 calories in a level teaspoonful of sugar? (Some people we asked guessed as high as 600.) Every 7½ minutes you'll normally use up as many calories as you get in a teaspoonful of sugar.

All statements in this message apply to both cane and beet sugar.

SUGAR INFORMATION, INC.
NEW YORK 5, NEW YORK



SOURCES: A.B.C.B., Bottling Industry, and best available trade estimates.

Behind York Oil Quality:

EXPERIENCE in manufacturing compressors

York Compressor Oils are the only oils on the market developed and produced by a leading manufacturer of refrigeration compressors

For over 30 years York has been producing oils specifically compounded and refined for the special requirements of refrigeration and air conditioning equipment. The knowledge and experience gained from these years of service and maintenance for such equipment helps York produce the very best in Refrigeration Compressor Oils. *Any* make of compressor benefits from their use.

York Oils are super-refined to withstand *both* high and low operating temperatures and bearing pressures under which they must lubricate moving parts of a refrigerant compressor. York Oil keeps compressors free of carbon on valves and gummy deposits on piston rings. It is chemically stable, bone dry, won't break down.

All over the world, trouble-free operation of hundreds of thousands of compressors lubricated with York Oils provides overwhelming evidence of York Oils' superior quality and ability to function perfectly under widely varying conditions.

YORK OIL IS STOCKED AT ALL YORK CORPORATION DISTRICT WAREHOUSES.

It always pays to use York Accessories & Supplies:

AIR FILTERS • AUTOMATIC CONTROLS • BRINE TESTING SETS • CHARGING CONNECTIONS • COILS AND PIPING • COLD STORAGE DOORS FREON REFRIGERANTS • GAS MASKS • ICE CANS • ICE PLANT ACCESSORIES • MOTORS • PUMPS • OILS • OIL TRAPS • PURGE DEVICES RECEIVERS • SUCTION TRAPS • VALVES AND FITTINGS

York refrigeration air conditioning

the quality name in refrigeration oils

HEADQUARTERS FOR MECHANICAL COOLING SINCE 1885

YORK CORPORATION

Design aim was to achieve a maximum of simplicity and a minimum of moving parts that might give maintenance headaches.

For high-temperature units, a standard Copeland Model 4-A-1 compressor is driven by a 3 hp. constant-speed hydraulic motor connected by high-pressure hydraulic power outlet hose to a 3 hp. constant-pressure hydraulic pump. The pump provides the same energy output over a trailer speed range from about 8 mph. to 55 mph.

Mounted on the rear axle, the pump is activated by a typical differential pinion drive. A 1-ton Ford differential is inserted into the 18,000 lb. Grico tubular axle. And a Morris flexible chain-and-sprocket coupling is used to link pump with axle.

The hydraulic motor provides all power for over-the-road refrigeration. When the trailer is in the dock, compressor is driven by a standby electric motor (220-440v, 5 hp.) coupled in line with the hydraulic motor. The standby motor is plugged into an electric outlet on the dock.

Use of a 5 hp. standby motor (rather than a 3 hp. one) is part of the system's simplification. The larger motor gives enough torque to take the full load on the compressor immediately the switch is turned on, thereby eliminating transmission belting and sheathes, pulleys, and bearings.

Motors (both the hydraulic and standby), hydraulic reservoir, and compressor are mounted on a platform suspended below the trailer body just forward of the rear axle.

In the high-temperature units built for Carnation, the compressor operates a standard evaporator coil cooling system using Freon 12 gas. Temperature is regulated by a solenoid-controlled bypass valve in the hydraulic system.

To insure constant circulation of air within the trailers, blowers are operated by an electric motor deriving its power from a storage battery (located on the suspended platform) rather than the hydraulic system.

Capacity of the initial high-temp installations (in trailers 21 ft. long and of 990 cu. ft.) is 7,000 Btu. The system is engineered to accommodate any size truck or trailer up to 40 ft. in length.

The same power system can be used for low-temperature refrigeration units (down to −20 deg. F.).

Carnation bought its first units for trial use on various kinds of hauls. They are now being used largely on newly acquired equipment. However, some other trailers may be converted as reports further bear out the values gained.

"Authority" of QC'ers

—*Continued from page 42*

manager (staff) reports to the superintendent, who also directs production department".

A similar situation was reflected in this reply that came from a general manager:

"I have complete control of the entire plant. I set standards and regulations, which I convey to my foremen. They have the authority to carry them out. The foreman of any department has the responsibility of action in his own department. If, however, he sees anything wrong, quality control-wise, elsewhere, he then may only make a request of the foreman in charge."

Question 3. Can those who are assigned to quality control halt production directly, in the interest of product quality?

"Yes" was the reply of 82%. However, a few did some qualifying. Here's an example:

"Yes, they can. But normally the system is allowed to perform to correct the problem, meanwhile any substandard material is automatically rejected."

Another answered:

"Our quality control is under the chemical laboratory. But all foremen, supervisors, or even machine operators have the authority to stop operations if quality is not up to top-management specifications."

Still another reported: "Line production may be stopped at once by any quality control man—by advising the department head of his desire to check operations or product."

Here are three more qualifying replies from "Yes" answers:

"Quality control personnel at our plant are in a separate salaried group that isn't in the union bargaining group. However, in an emergency they can stop production."

"Yes, our QC'ers can halt production in an emergency. When proper line management is not immediately on hand, responsibility is automatically 'assumed.'"

"We have staff production men who are responsible for plant quality. They pass their authority to the production superintendent in each plant and hold them fully accountable."

One of the "No" respondents had this to contribute:

"Quality control, in its broad sense, is strictly a separate staff function for service and reporting. It follows through to the director of laboratories, who is an equal member of the management board with line people. Our production-operations people have (on their own payroll and in their own plants) people performing a quality control job more on an hour-to-hour routine check basis.

Yet another said:

"Our laboratory follows the routine of reporting to the plant manager. Inspectors report to plant superintendents who are on a management level below managers. Neither of the quality control units can issue orders to plant personnel, but must work through plant superintendents."

A further modifying comment was:

"Persons responsible for our quality control cannot halt production directly, in the interest of quality, unless the situation should be of such emergency that a consultation cannot be held with the supervisor in charge."

Question 4. If your QC people have no line authority, to whom do they report in order to insure necessary action?

Answers indicated that, from one company to another, problems requiring decisions are put before the whole range of executives—from the president on down to the lowest-rung man in line management. In short, the replies followed no set pattern. Examples:

"All QC personnel report directly to the plant manager" . . . "Reports go to the production foreman" . . . "Requests go to the top—but it should be noted that such requests carry top priority and weight" . . . "They may go anywhere from foremen up to and including assistant plant manager" . . . "Right to the plant manager" . . . "Department foreman first and then, if no response, division superintendent and finally plant superintendent" . . . "Vice-president in charge of production."

One reply was more lengthy than the others, saying:

"Our QC department is considered staff, but performs functional duties in respect to inspection. This department reports to the vice-president in charge of production. Part of the staff duty of QC is to prepare specifications for both raw materials and finished products."

. . . Editor's own comment: Maybe those plant men are right—the ones who keep saying: "But—the food industry is *different!*"

End (*Resume reading on page 43*)

In Behalf of Progress . . .

No Avenue of Progress Was Left Unexplored

No chance to turn up new ideas was neglected. No sources of know-how were overlooked. And no types of advanced materials and equipment were ignored.

We refer to the conception, planning, and construction of the new pace-setting H. W. Lay & Co. plant (page 56).

There you have a case-history formula for pace-setters in the food industry. Dreaming and creative thinking are essential ingredients of the formula. A pace-setting operation is no carbon copy. It is something shaped up in the minds of men and translated into reality through engineering.

The open mind is a must in this kind of progress. For the mind closed to the ideas of others keeps out more than it keeps in. The mind must be thirsty for advanced knowledge, too. And it must itself be able to conceive advances.

But behind it all is a high level of dissatisfaction with things as they are. Plus the courage to depart from the traditional and try the new.

Translated into definite procedures, here's how Lay developed its ideas and plans. Since World War II, the firm's executives and engineers had been studying advanced food factory construction, layout, and unit operations. And all the time they were doing their own creative imagineering in an attempt to conceive something better than the best.

They visited many modern food plants, developed dozens of new ideas in their own organization, and discussed ideas, plans, and problems with leaders in the field. When coming down the "home stretch," the company utilized the services of consultants, architectural firms, and equipment companies.

The payoff comes in many ways, such as a system that saves $20,000 a year in handling potatoes, plus $140,000 worth of floor space.

And the benefits extend from the great to the little. No item was too small to be considered. For example, the lighting system includes a special circuit which permits the night watchman to turn on one light in every part of the plant before he starts his rounds—by the flip of one switch.

Other manufacturers can borrow ideas from this new plant. But they can profit even more by emulating the approach to progress which made the plant possible.

This achievement was made by a company without extensive research facilities or a big engineering department. If they could do it, so can you.

Try Technicians

A great hue and cry has gone up about the shortage of scientists and engineers. Yet, management often assigns scientists and engineers to tasks that can be adequately performed by technicians.

Maybe it's because the schools turn out too few ready-made technicians to meet industry's needs. Some 14,000 a year are graduated, which is about one for every two engineers—a ratio that should be reversed.

But food companies should develop their own technicians. They can take high-school graduates with basic education in science and develop them into valuable assistants for their technical people. Or they can send promising employees to school.

We know of one food technologist who was freed from laboratory routine by a bright young lady with a major in high-school chemistry. As a result, he was able for the first time to get out into the plant and effectively use his technical know-how to improve quality, sanitation, and processing.

So technicians not only are one answer to the shortage of technical manpower, they are an asset in their own right.

Nuclear Scare

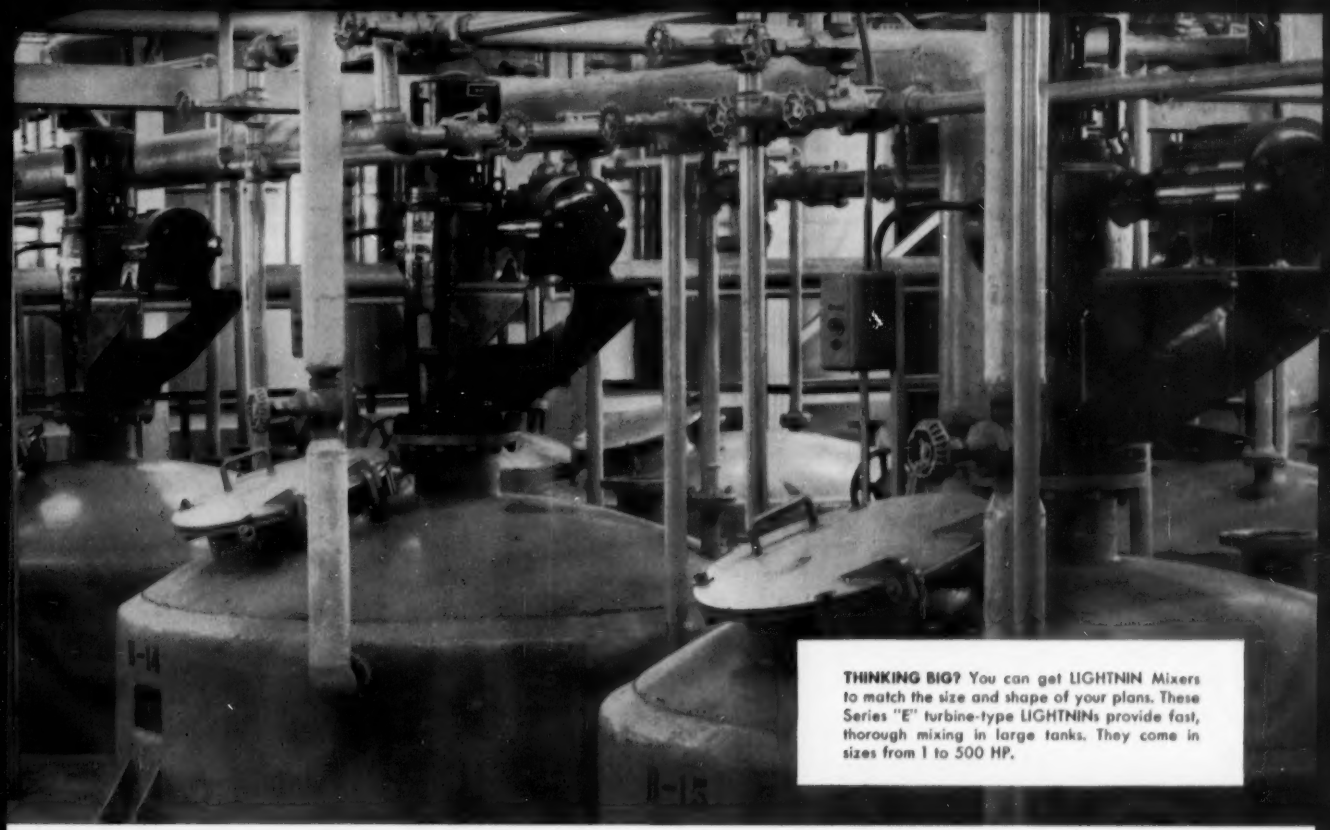
That dire biological effects will come from future industrial development of the atom was prognosticated in June by the National Academy of Sciences. And in summing up the results of its study, NAS saw some serious problems for food manufacturers and processors.

Because our industry needs uncontaminated water, the story goes, it will feel "profound effects" from the presence in water and air of large quantities of radioactive wastes released by future nuclear power plants and other atomic industries.

But don't get too excited. Our nuclear friends tell us that this is not likely to come to pass. Nuclear reactors are necessarily heavily shielded to protect personnel. So they won't discharge radioactive materials into the air short of an explosion. And up to now there have been no such explosions.

Also, Naval Research Laboratory scientists report that the radioactive fallout from all atomic and hydrogen bomb tests so far conducted probably will produce less than the lifetime dose due to natural and cosmic radiation.

So there!



THINKING BIG? You can get LIGHTNIN Mixers to match the size and shape of your plans. These Series "E" turbine-type LIGHTNINs provide fast, thorough mixing in large tanks. They come in sizes from 1 to 500 HP.

How to save money *on big fluid mixing jobs*

When you're planning a bigger-than-usual investment in fluid mixing equipment, ask yourself this "payoff" question:

"Will it keep my mixing costs in line *for the next 10 or 20 years? How?*"

Your investment pays off now—and keeps paying off, in long-term savings, when you specify LIGHTNIN Mixers.

Here's why:

1. Save when you buy. You eliminate costly false starts when you specify LIGHTNINs. You're covered 100% by an unconditional guarantee that says your mixer *must* do the job for which it is recommended—or your money back.

You get the mixing results you want, without paying for unwanted horsepower. The *one* correct mixing pattern for your process is assured, through scientific mixer selection and scale-up based on thousands of pilot runs.

And you save on installation, because LIGHTNINs arrive fully assembled, factory-aligned, ready to mount and run, without extra construction.

2. Save while you mix. You minimize shutdowns when you mix with LIGHTNINs. Hundreds of LIGHTNINs have been in service 20 years and more. Flex-protected gearing and other unique mechanical features add extra years of useful life. If you ever need to, you can get standard replacement parts from factory stock, shipped on 24 hours' notice.

3. Save if you ever convert. You can often adapt LIGHTNINs to handle new mixing needs. You can, for instance, switch the same standard Series "E" LIGHTNIN from open-tank to closed-tank service; from top-entering to bottom-entering mounting; and through a full range of standard mixing speeds from 16.5 to 420 RPM. And you do it with *standard stock components.*

You can get LIGHTNINs to handle *all* your fluid mixing—in any open or closed tank of any size or shape. Hundreds of power-speed combinations. Sizes from 1/42 to 500 HP. All are fully guaranteed.

For quick service, just call your LIGHTNIN Mixer representative. He's listed in Thomas' Register. Or write us today.

"Lightnin® Mixers"

MIXCO fluid mixing specialists

GET HIGH PRODUCTIVITY on smaller batches, too. Make any open tank an efficient mixing unit, with the proper LIGHTNIN Portable Mixer. Thirty models.

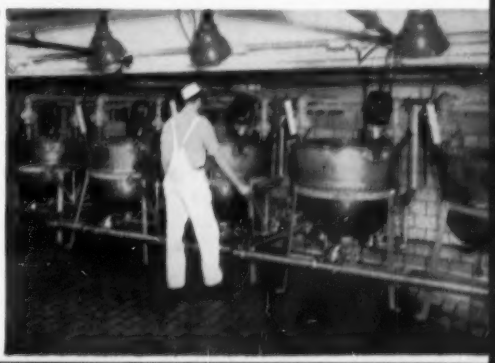
FOR LATEST MIXING INFORMATION and full description of LIGHTNIN Mixers, send for these helpful bulletins:

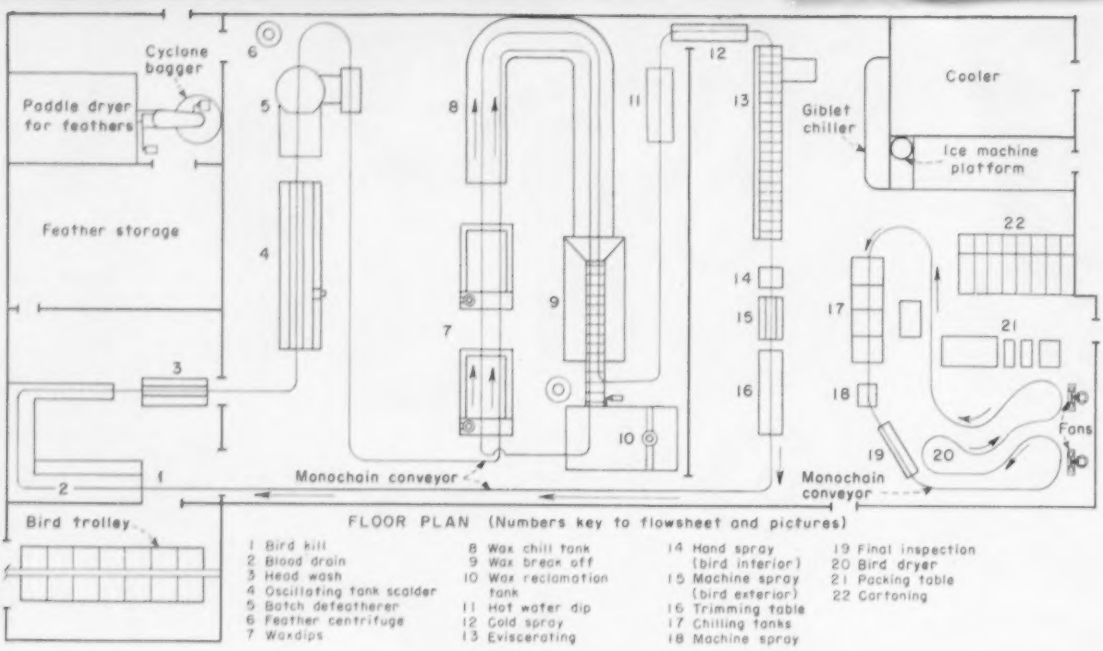
- ☐ B-102 Top or bottom entering; turbine, paddle, and propeller types: 1 to 500 HP
- ☐ B-103 Top entering; propeller types: ¼ to 3 HP
- ☐ B-108 Portable: ⅛ to 3 HP
- ☐ B-104 Side entering: 1 to 25 HP
- ☐ B-112 Laboratory and small-batch production types
- ☐ B-109 Condensed catalog showing all types
- ☐ B-111 Quick-change rotary mechanical seals for pressure and vacuum mixing
- ☐ B-107 Data sheet for figuring mixer requirements

Check, clip, and mail with your name, title, company address to:

MIXING EQUIPMENT Co., Inc., 143-h Mt. Read Blvd., Rochester 11, N. Y.

In Canada: Greey Mixing Equipment, Ltd., Toronto 10, Ont.





Whole-Bird Process — *Conveyorized*

Ducks put through top-flight equipment by 'monochain' to minimize costly hand labor

HIGH-SPEED MECHANIZATION is the guiding theme at Pine Crest Duck Farm, Sterling, Mass. Here, costly hand labor is minimized by ingenious company-designed and purchased equipment. And ducks whisk through processing to freezing at up to 1,800 per day—with operations quality-controlled, literally, from egg to package. For each group of fledglings (3,600 birds) is raised separately, but under identical growing and feeding conditions, in the company's own hatchery.

When a flock is exactly 8 weeks old—before pinfeathers appear—it moves next door to a holding pen at the plant.

Birds are loaded into a wire-mesh, monorail trolley, holding about 56 birds, and rolled to process line.

After they are hung on an endless, monochain conveyor, ducks are hand-killed—Point (1) on accompanying foldout flow sheet—then pass over drain pans for bleeding. Blood is removed from birds' mouths by a special washer developed by the company, Point (3).

Next comes scalding, which is accomplished without removing birds from conveyor. Chain merely dips and immerses them in an oscillating hot water tank (Barker Equipment Co., Modesto, Calif.).

As they emerge, a worker unpins and piles fowl on a table. When 8 ducks have accumulated, they are pushed into a batch defeatherer—Point (5).

This latest device (Pickwick Co., Cedar Rapids, Iowa.) is equipped with a rotary plate in the bottom. As it spins, birds are flung against sides that are studded with molded, rubber fingers. A ring-shaped spray pipe, located around periphery of unit, washes feathers from unit.

To do the job properly—avoiding quality-damaging bruises—requires accurate timing. At Pine Crest, the operation is adjusted to run 1 min. After this interval, a preset timer opens a latch and a side door swings open. Centrifugal force tumbles birds onto a table. Then a worker repins them on the non-stop, monorail conveyor.

To complete defeathering of birds, the company uses a special wax dip (7). Here, birds are lowered successively into two tanks (Barker). Moving on, coated ducks are chilled by dipping them in a cold-water bath.

Finally, wax is stripped off by hand (9). With it go any remaining feathers—and even pin feathers from the occasional over-mature bird. Ducks circle around and repeat dip, chill, and stripping to insure a clean job.

Hardened wax drops into a trough and is conveyed to a remelt tank. At frequent intervals, contents of latter are washed, centrifuged, and returned to baths.

Ducks continue to a thermo-controlled hot-water dip (150F.) that removes any remaining trace of wax. A subsequent cold-water spray chills birds.

After evisceration (13), ducks pass an operator who washes birds' insides with a spray nozzle. Outsides are cleaned next in a company-built double-spray washer.

Unpinning follows, and birds receive any necessary hand trimming. From here, they are loaded into wheeled tubs, each holding about 100 birds. Crushed ice is added, and an air hose agitates the mixture to speed cooling.

At the end of this period, fowl are rehung on a second monochain conveyor—Point (17)—washer in a double-spray unit, and given a final inspection. Then, birds are dried by fan blasts.

Reaching packaging stage (21), ducks are removed from conveyor. Neck flaps are tucked in, and kraft-paper-wrapped giblets and neck are inserted in body. A second worker slides bird into a printed Cryovac bag and adds a recipe booklet.

Proceeding through vacuum sealer and hot-water shrinker, package is weighed, marked, and boxed, 6 to a carton. Palletized cartons are rushed to a cold storage warehouse, where they are blast-frozen at —50F.

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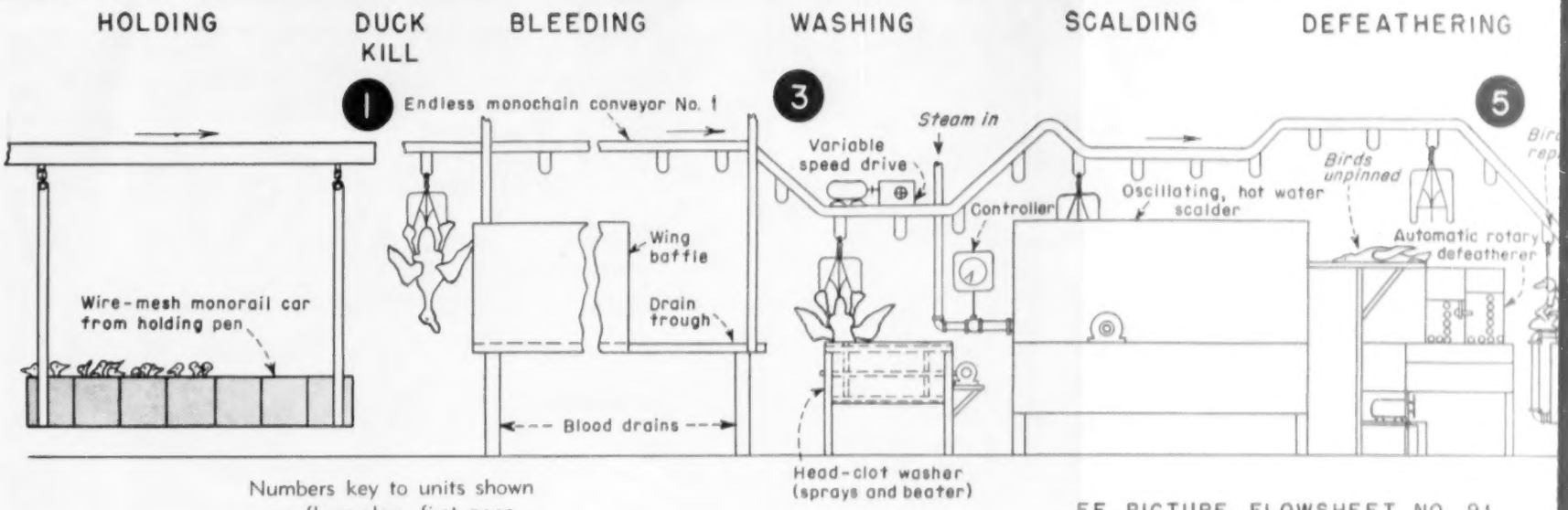
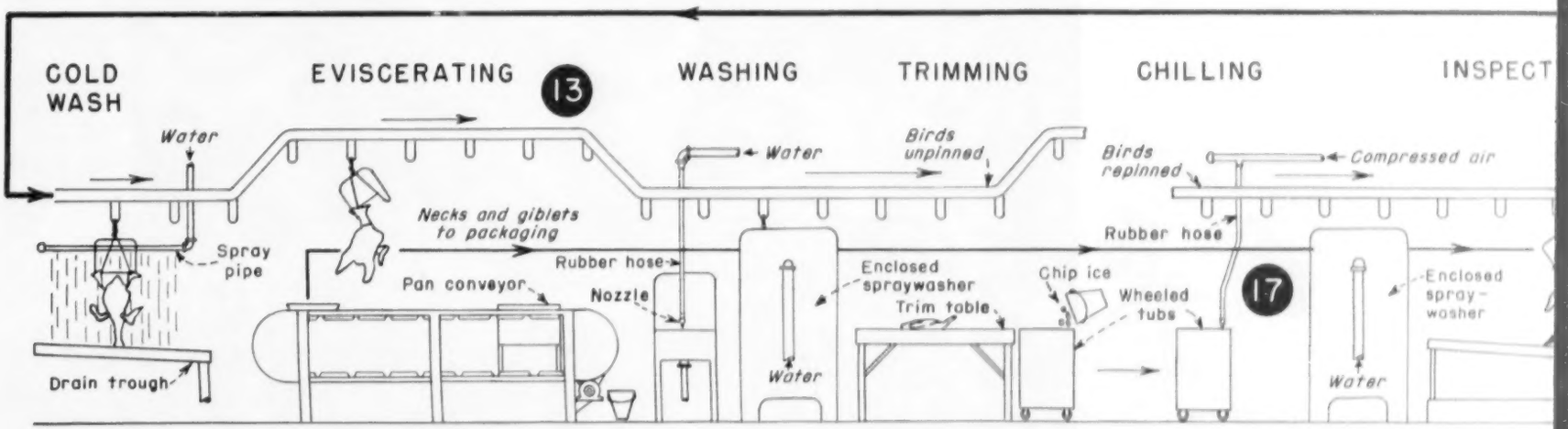
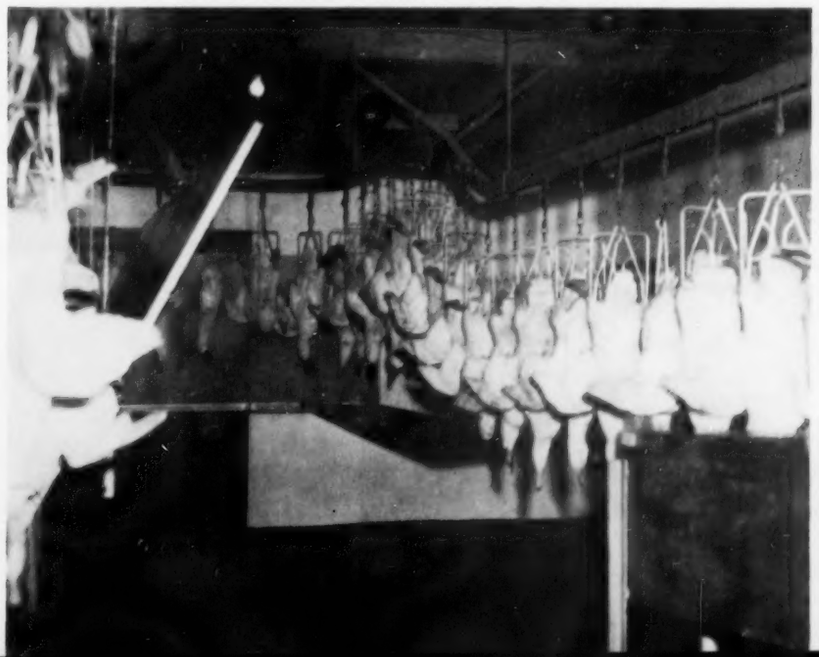


Numbers key to units shown on floor plan, first page

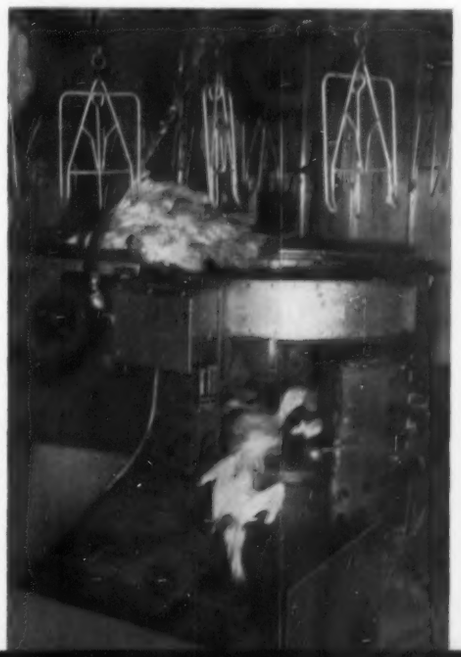
FE PICTURE FLOWSHEET NO. 91



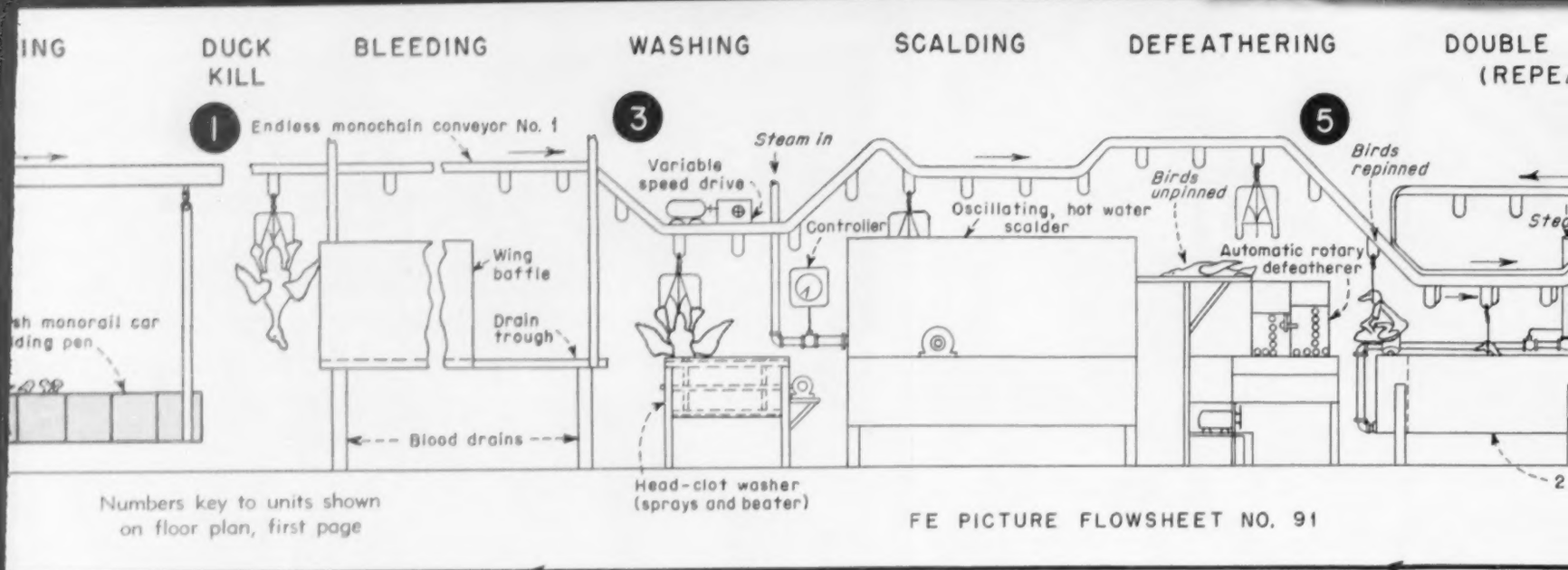
1 **DUCK KILL** takes place at left. The angled baffle (center) holds down wing-flapping and minimizes bruising of birds. Blood in ducks' mouth is removed by unit at right. Here, a rotary paddle oscillates heads, while three sprays wash out the clots.

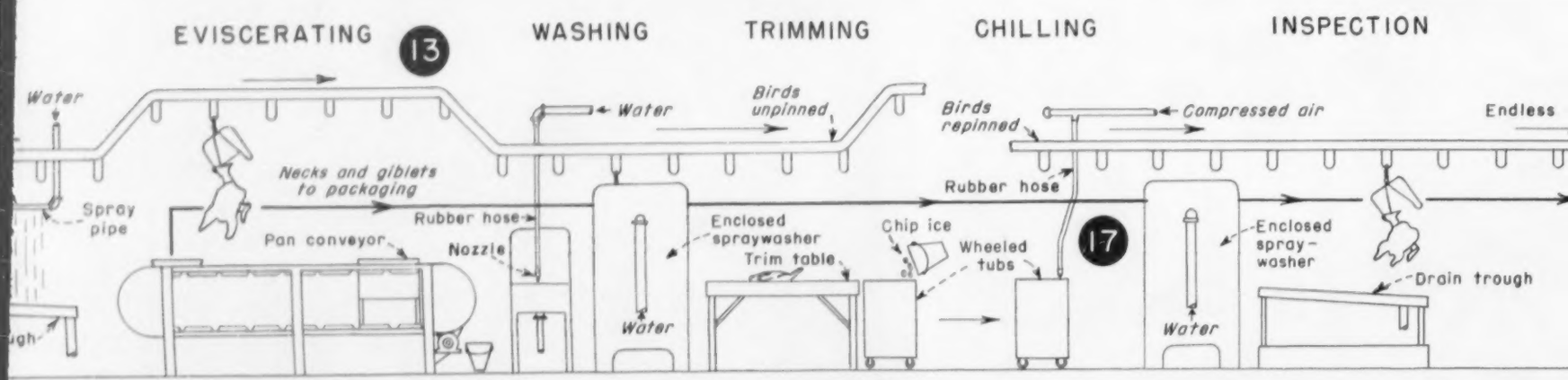


5 **NEW DEFEATHER** cleans an 8-bird batch in 1 min. A spinning plate and many rubber fingers do the trick. Time-latch releases door.



7 **DOUBLE-DIPPING TANKS** co... First dip is thermo-controlled ... pass on to cold water bath (rear)

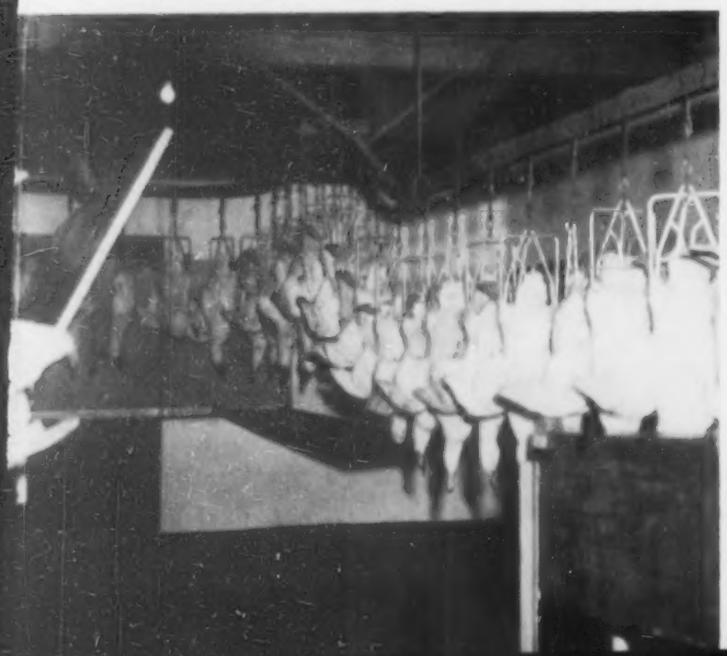


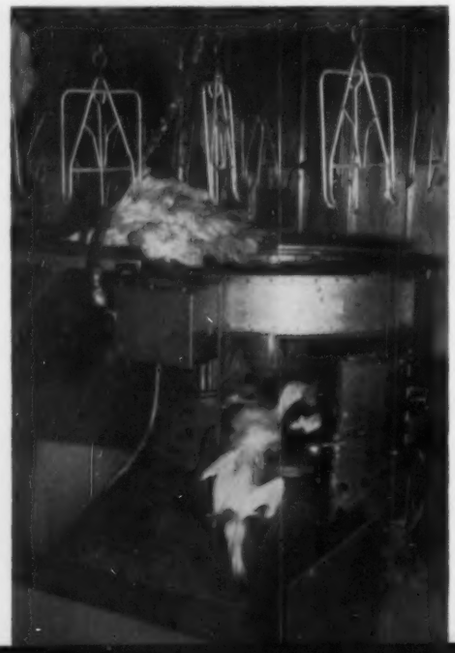


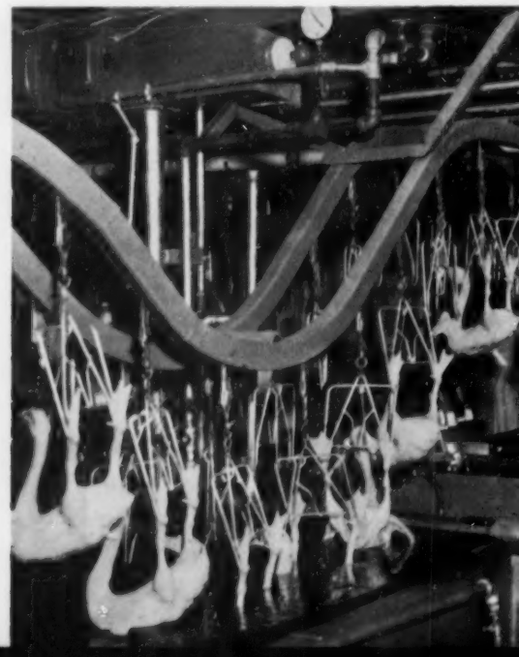
KILL takes place at left. The angled baffle (center) holds down wing-flapping imizes bruising of birds. Blood in ducks' mouth is removed by unit at right. ary paddle oscillates heads, while three sprays wash out the clots.

5 NEW DEFEATHER cleans an 8-bird batch in 1 min. A spinning plate and many rubber fingers do the trick. Time-latch releases door.

7 DOUBLE-DIPPING TANKS coat fowl with a special w First dip is thermo-controlled at 170F., second at 150F. pass on to cold water bath (rear) that hardens the wax.





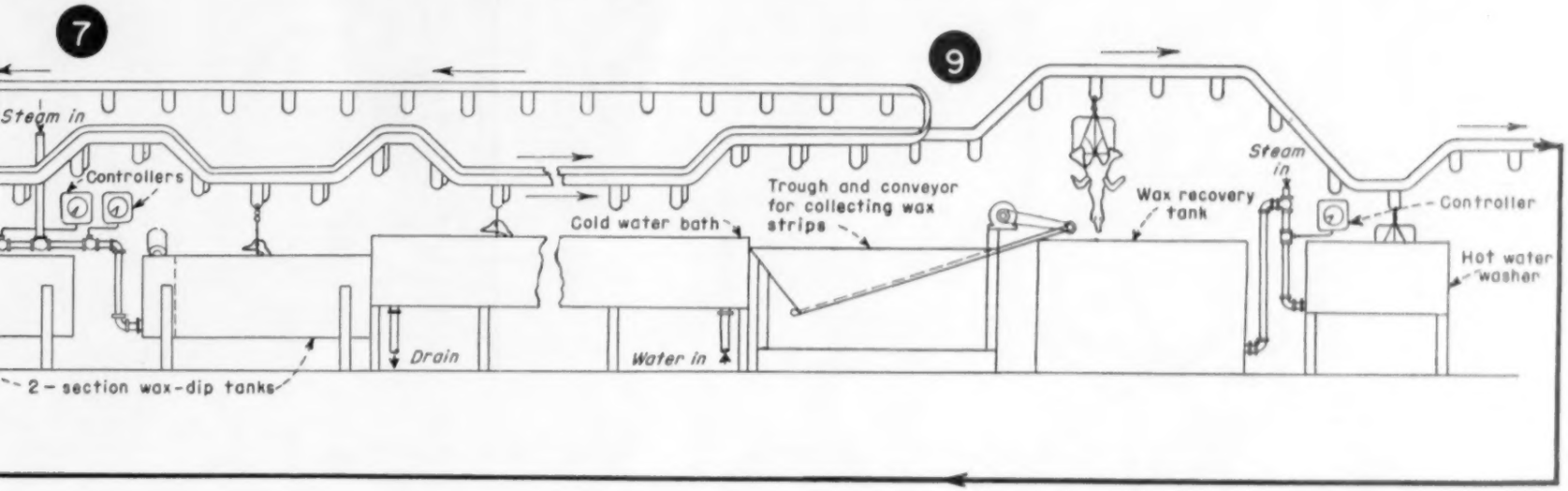


LE WAX DIP
PEATED)

WAX CHILLING
(REPEATED)

STRIPPING
(REPEATED)

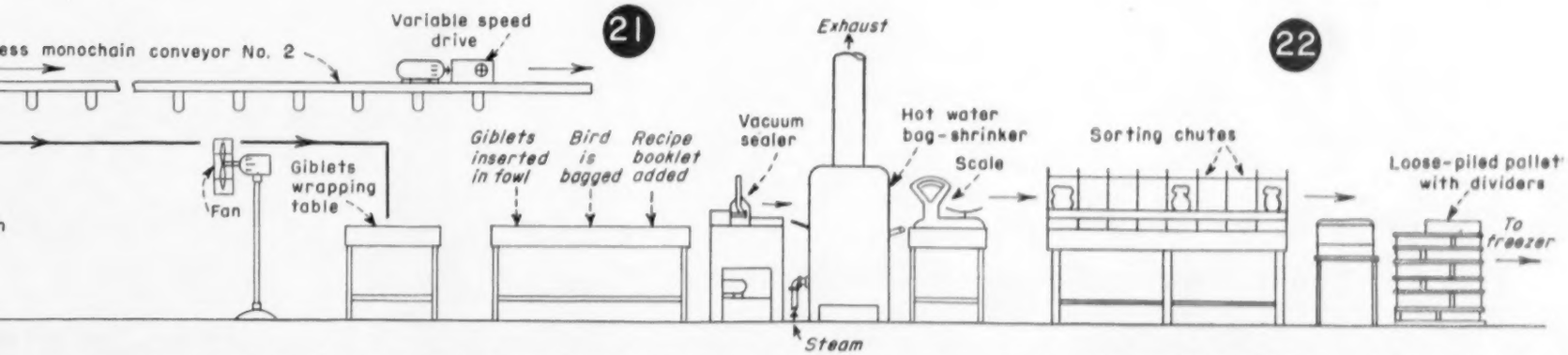
HOT WASH



DRYING

PACKAGING

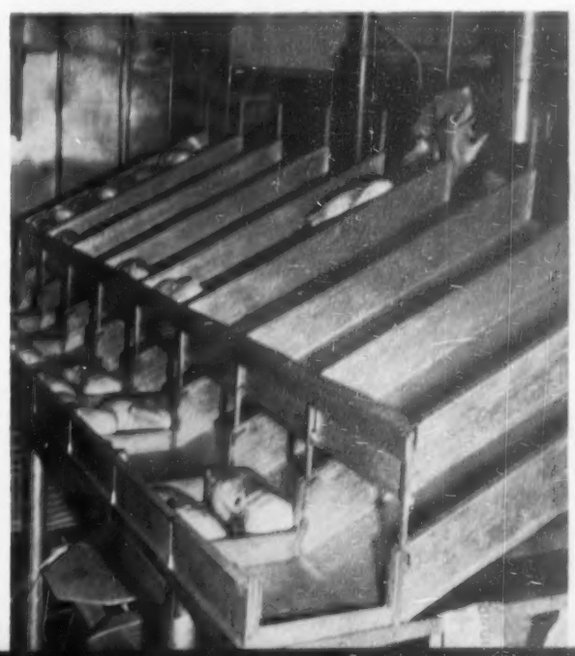
CARTONING



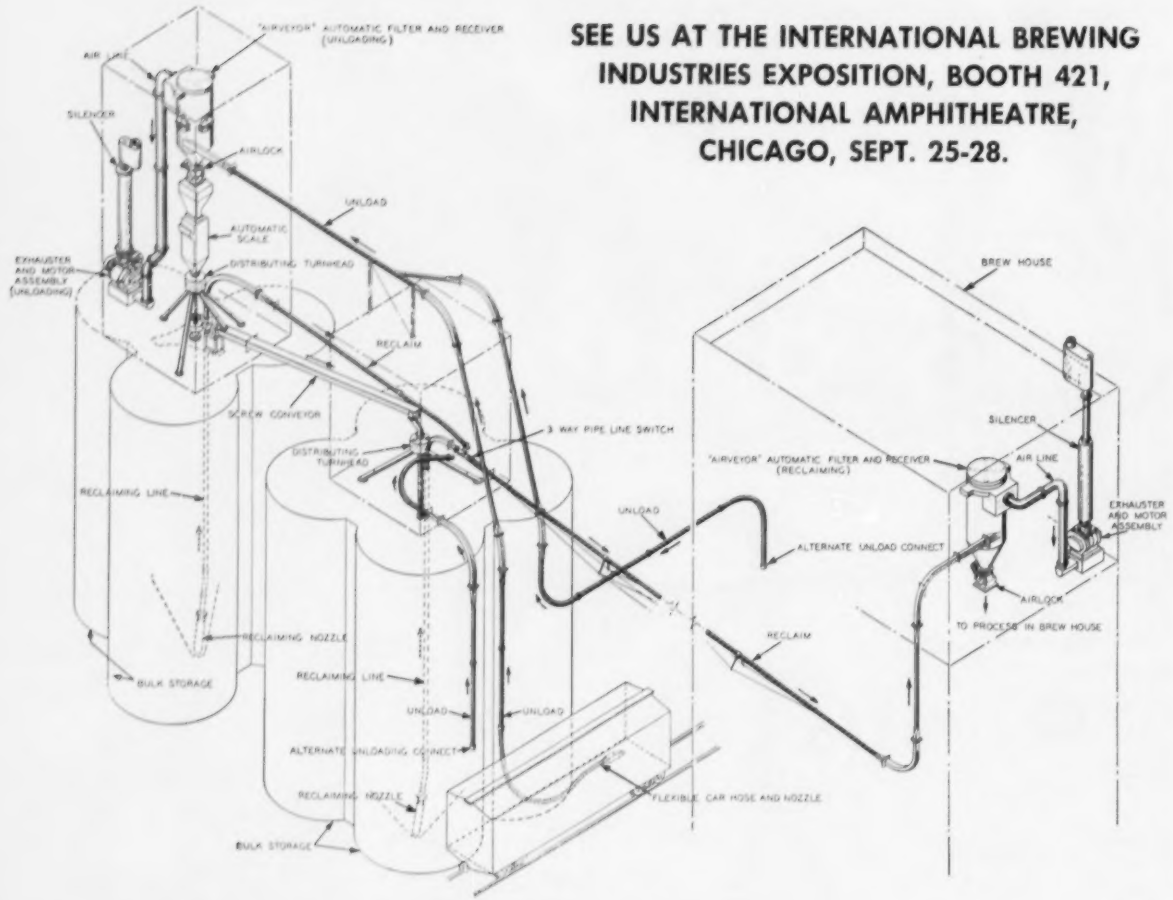
ial wax (Duxwax, National Wax Co., Chicago). 150F. to avoid melting the first coat. Birds then wax. Dip tanks (Barker) have double shells.

9 **WAX STRIPPING** is done by hand, and removes even the occasional pin feathers. Wax is dropped into a trough conveyor, and is remelted. Ducks then repeat dipping-stripping steps.

22 **FINISHED BIRDS** are packaged in plastic and weighed. After weight is marked on wrapper, they are sorted into these chutes for final cartoning.



SEE US AT THE INTERNATIONAL BREWING INDUSTRIES EXPOSITION, BOOTH 421, INTERNATIONAL AMPHITHEATRE, CHICAGO, SEPT. 25-28.



An example of experienced engineering . . . at Lucky Lager Brewing Company's San Francisco Plant

San Francisco brewery of Lucky Lager Brewing Company.

Thirty years of study and experience, putting air to work, has had its reward. This is well exemplified by the Airveyor® conveying system originally installed and later expanded at Lucky Lager Brewing Company's San Francisco brewery.

Starting in 1936, the first Airveyor system was installed for unloading from cars to storage bins and reclaiming from this storage. As demands increased, the system was enlarged, more storage bins were added, and additional Airveyor equipment installed for reclaiming from storage and conveying to process in the brewhouse.

Working closely with Lucky Lager's engineers, making studies and checking all possibilities from every angle, resulted in a conveying system that more than meets all specifications and requirements of this modern plant. Truly, an example of *experienced* engineering.

When you need fast, clean, efficient conveying, consult Fuller . . . you'll find a Fuller engineer glad to make studies of your requirements and submit recommendations, without any obligations whatever. No matter if you operate a small or large brewery, it will pay you to investigate the possibilities of the Airveyor. Write for Bulletin A-18 today.

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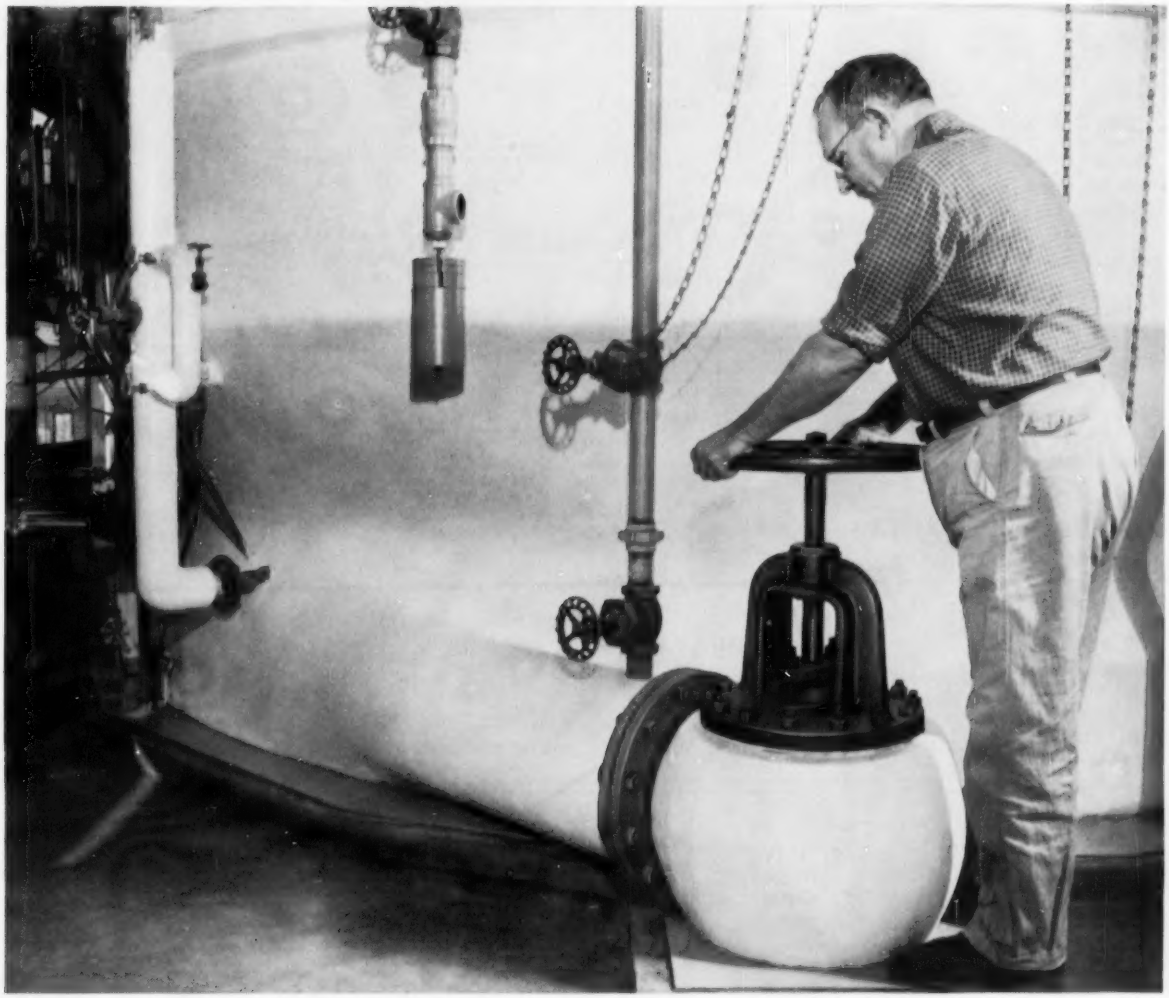


This Crane valve at Imperial Sugar has a sweet performance record

Six years of trouble-free performance are behind this Crane valve. It's a No. 353 12-inch iron body angle pattern.

Since 1949, this valve has been on 10 to 15 psi. steam service at 350° F., in the Imperial Sugar Co. refinery at Sugar Land, Texas—with no leakage, no service repairs, no maintenance of any kind. The valve is operated 2 or 3 times a week. Today, closure is just as tight and sure, and operation as easy and smooth, as the day it was installed.

Actually, this is only an average performance record for Crane valves on steam service. Every dimension, every design feature built into these rugged valves is precision-engineered for years and years of trouble-free operation.

It's just good sense not to take chances in selecting valves for steam service. Specify Crane and make sure you're getting the best valves made—backed by the world's greatest experience in the valve field, with the broadest line of all to choose from and the finest materials available today. Get full information from your local Crane Representative, or write to the address below.

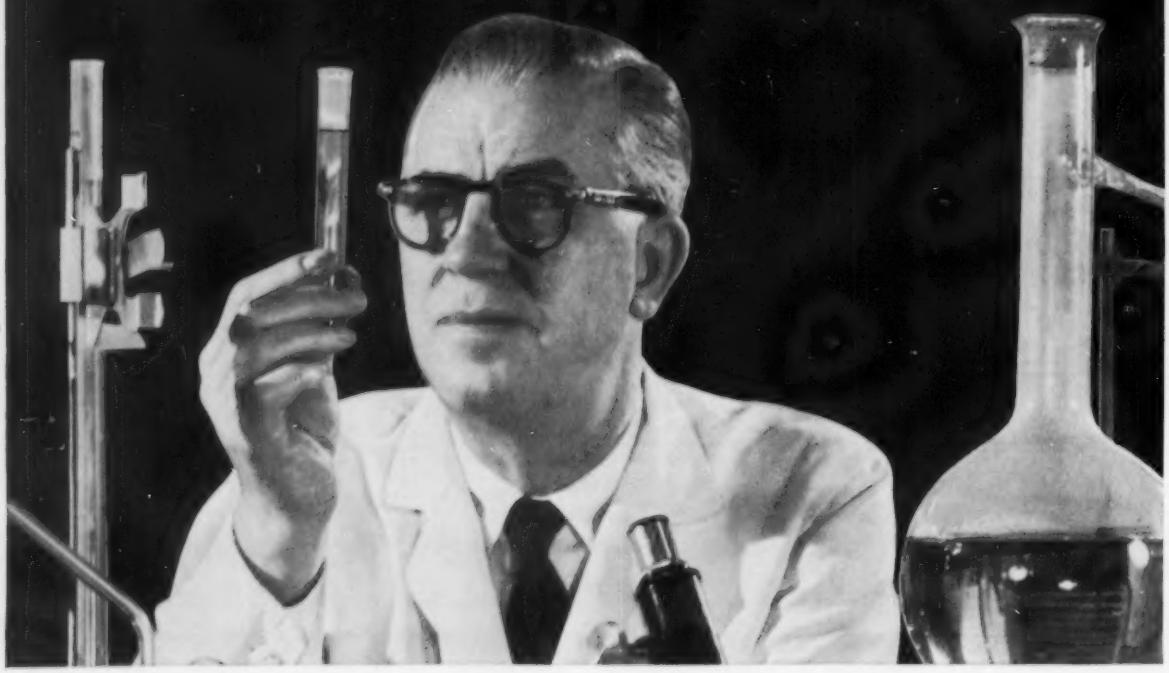
CRANE VALVES & FITTINGS

PIPE • KITCHENS • PLUMBING • HEATING

Since 1855—Crane Co., General Offices: Chicago 5, Ill. Branches and Wholesalers Serving All Areas

Got a Processing Problem?

Think your processing could be better? More economical? Ask the men at Quaker Oats—they can find the answer!



What Quaker has done in the food processing field is a truly *amazing* story. A story that *should* be told in person.

Quaker, with years of experience in oats, corn and barley, recently added rice flour to the list. These flours have almost *unlimited* application in food processing. They are extremely neutral. Used as thickeners or carriers they assume characteristics of other ingredients—or characteristics can be accentuated or eliminated. You can have *any* size granulation—from the original grain to microscopic size. And all work is done under excellent temperature control. Yet these flours are very economical—save you money in processing.

Quaker's men and modern machines will work on *any* type of blended product. They insure you of highest quality. Quaker offers diversification of mills so all your eggs aren't in one basket. And Quaker is equipped to handle bulk—still another saving for you.

Quaker's resources and abilities in the processing field have only been touched upon here. The possibilities are endless. Let us help you as we have already helped so many major food companies. If you have *any* processing problem, call or write Industrial Food Sales, The Quaker Oats Company. No matter *what* the problem, it will be worth your while.

QUAKER

THE QUAKER OATS COMPANY
CHICAGO 54, ILLINOIS

THE SHORTAGE OF SCIENTISTS AND ENGINEERS:

A Threat to Economic Progress

THERE are two paramount reasons for concern over the serious shortage of scientists and engineers that now confronts the United States:

- The first reason, with which this editorial deals, is that continued expansion of our economy and further increases in our living standards are threatened unless we train more scientists and engineers and use them more effectively.
- The second reason for concern is that we run the risk of falling behind the Soviet Union in the technology so essential to national security. The consequences of losing this race to the Russians are not comforting. (The possibility that this might happen over the next few years was discussed in an earlier editorial in this series.)

The crucial contribution of scientists and engineers to the well-being of the American people has been to find ways of making better use of limited resources, to make equipment more productive, to develop new and better products that enrich our lives, to enable us to live longer and be healthier. They have made this contribution with greater success in the last 15 years than ever before, but it has required progressively more resources and more trained people.

During this 15-year period our annual production of goods and services, in dollars of constant purchasing power, has almost doubled. Since our total population has increased only 25 percent, this has meant a tremendous rise in the economic well-being of the American people as a whole. But in accomplishing this, the number of scientists and engineers has been more than doubled.

Tasks for Research

If the American economy is to continue to grow and if our living standards are to show further improvement, the work of scientists and engineers must be stepped up even more in the years ahead. Unless answers to several pressing problems are found through intensified research efforts, economic progress will become increasingly more difficult.

Productivity per hour of labor must be increased at a faster rate. Improved medical care has greatly increased the number of people who attain retirement age, and sharply higher birth rates since the war will mean larger numbers of children in school and college. Meantime, because of low birth rates during the depression, the number of people reaching working age is not rising nearly so fast. The result is that over the next 20 years our population will increase by about one-third, while the total manhours worked are not expected to increase more than 15 percent. So, simply to maintain the same living standards for a rising population — with no provision for additional improvements — ways must be found to enable each worker to produce for more dependents.

It is primarily to the scientists and engineers that we must look for help in making human labor more productive. This will require enormous increases in our power

resources. We will need to make more effective use of our existing fuel supplies — coal, oil and natural gas. And we will have to devise economically practical means of tapping other energy sources, particularly nuclear power and new rocket fuels.

Also, better ways must be found to use scarce and low-grade raw materials. Thanks to great strides in metallurgy and mining techniques, we are now utilizing sources of copper and iron ore that, for all practical purposes, were not available to us only ten years ago. Similar strides are needed in the mining and processing of bauxite if low-grade domestic ores are to help satisfy a fast-growing market for aluminum. And stubborn technical obstacles in the area of "high temperature" metals—such as nickel, cobalt, columbium, tantalum and titanium — are impeding progress in jet and turbine engines.

These are only a few of the challenging tasks that demand intensified research and engineering activity in the years immediately ahead if the United States is to continue to raise living standards. We need more houses, schools and highways for a rising population, more medical research to reduce further the ravages of illness, more research in chemistry and other sciences to sustain the flow of new and improved products that are so essential an ingredient of our economic progress.

Ceiling on Growth

American industry has indicated that it is ready to meet the challenge and undertake vastly expanded research programs. A recent survey conducted by the McGraw-Hill Department of Economics revealed that total research and development expenditures of American industry were almost $5 billion last year, 29% higher than in 1953. By 1959 business plans to be spending well over $6 billion on research and development. And the total could well prove to be much higher, based on the trend of recent years.

But industry's programs for research and development cannot be carried out unless enough qualified research workers and engineers are available. Ernest R. Breech, chairman of the Ford Motor Company, recently described the supply of engineers as the "ceiling on our future growth." He gave force to his point by announcing: "If 900 qualified engineers were to approach us next week looking for jobs, we would hire every one." The U. S. Bureau of Labor Statistics found in interviews with some 200 large companies at the end of 1954 — a recession year — that at least half were unable to hire enough research scientists and engineers to meet their needs. A third of the companies reported substantial shortages of technical personnel.

The shortage of technically trained people, furthermore, is becoming more acute. The number of engineers and scientists now being graduated is only about enough to cover replacement requirements, while the needs of industry, government and education are mounting every year. According to the best information available — as indicated in the first editorial in this series — these needs are now about twice as great as our current engineering graduating classes and annual production of scientists with Ph. D. degrees.

To perform the research needed to remove roadblocks to our economic progress — and at the same time hold our own in the technology essential to our security as a free nation — we must have an adequate supply of men and women with engineering and scientific training. Instead, we are faced with an acute shortage, now and for several years to come. Reasons for the shortage and proposals for working our way out of the shortage will be discussed in the remaining two editorials in this series.

This is one of a series of editorials prepared by the McGraw-Hill Department of Economics to help increase public knowledge and understanding of important nationwide developments of particular concern to the business and professional community served by our industrial and technical publications.

Permission is freely extended to newspapers, groups or individuals to quote or reprint all or parts of the text.

Donald C. McGraw

PRESIDENT

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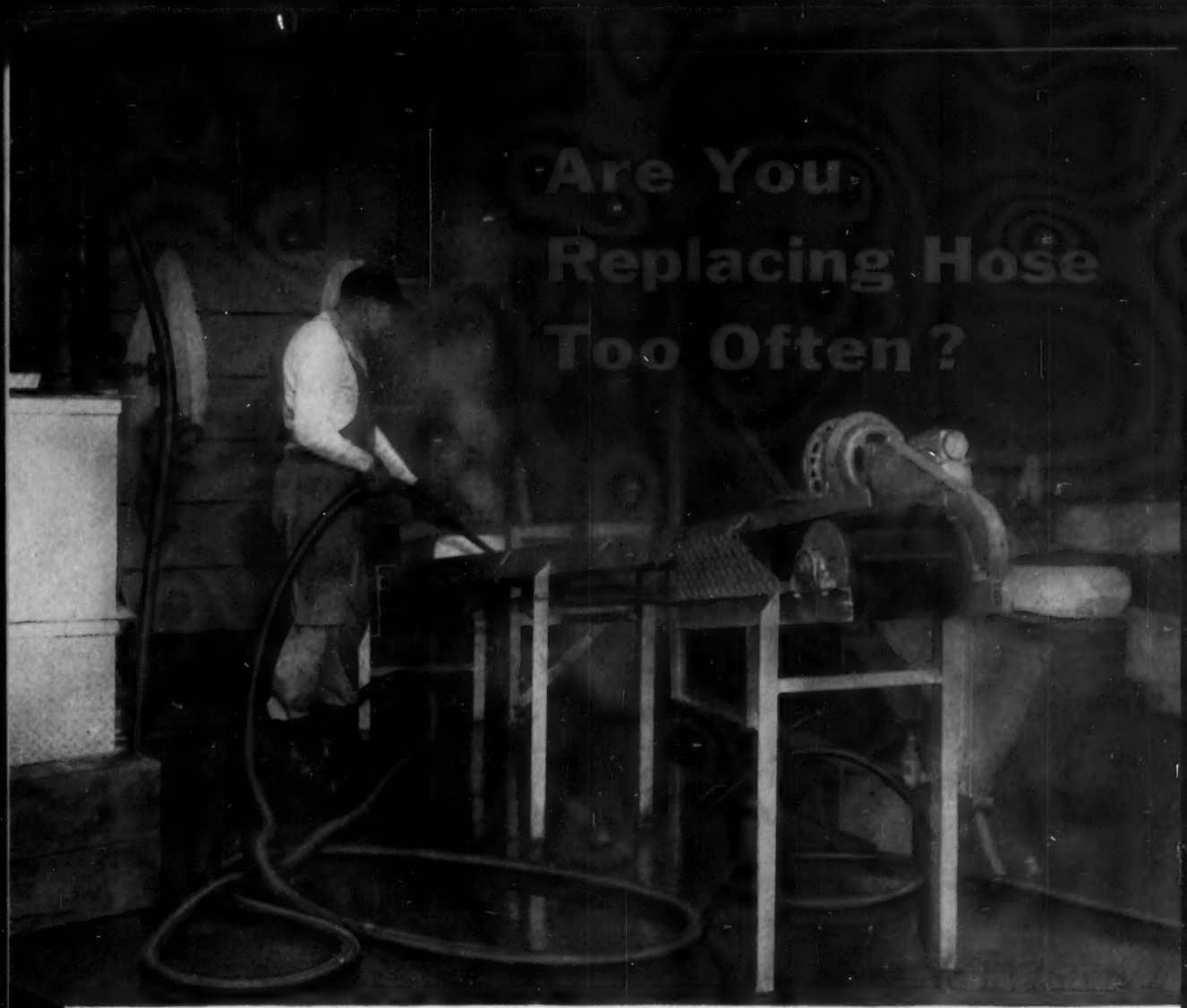


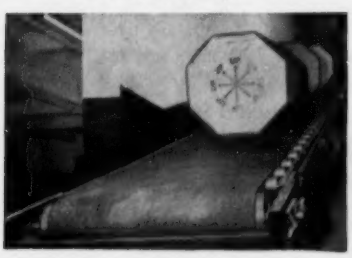
Better change to Thermoid as Bonner Packing Company did!

This California packer of raisins, figs and apricots was replacing steam hose on an average of every six months. Then they tried Thermoid Powerflex Wire Braid Steam Hose.

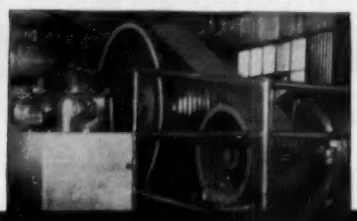
Thermoid engineers know the beating that steam gives hose. And they've designed Powerflex Wire Braid to take it! At Bonner Packing Company, this powerfully reinforced 1"x2 braid hose is still on the job after 18 months, with still no signs of need for replacement.

There's a Thermoid Hose built to give you longer service and maximum economy in your specific application. It will pay you to get in touch with your Thermoid Distributor, or write direct for his name and a copy of our latest Hose Catalog.

Cut costs with Thermoid Conveyor Belting . . .



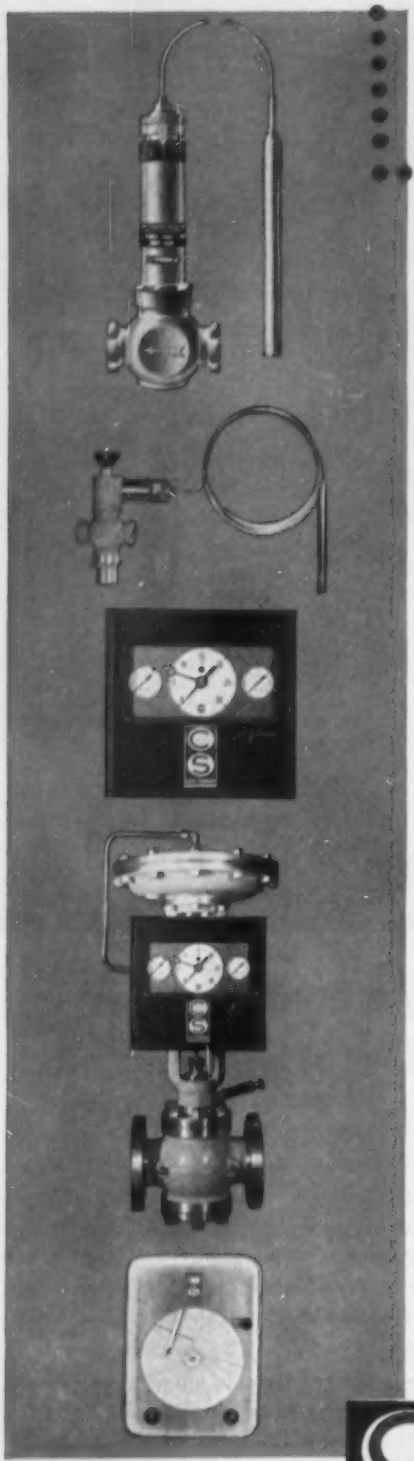
. . . and Thermoid Multi-V Belts



Thermoid

Thermoid Company, Trenton, N. J.

For Accurate, Reliable Temperature Control



STACON V SERIES
Self Operating Temperature Regulators—

Feature a liquid filled thermal system for high operating power and uniform throttling action and has built-in over-load protection. Available in 50°F. and 100°F. ranges from 25° to 325°F. Direct and reverse acting units ¼" to 1½" with screwed ends, and 2" to 4" with flanged ends. Bulletin No. 500. (Cash Standard Stacon Corp.)

STACON TYPE VS
Temperature Safety Regulators—

Used in the supply steam or gas line and will protect a process by snapping shut when the process temperature goes above a desired temperature level. Easily adjustable and remains closed until manually reset. Available in sizes from ½" to 1½" with screwed ends. (Cash Standard Stacon Corp.)

CASH STANDARD TYPE 51
Indicating Controllers—

An air operated, mercury actuated proportional temperature controller. Temperature ranges from —40°F. to 1000°F. Calibrated set point adjustment, unit construction, air relay with sapphire orifice and push button cleaner, feedback type proportional control with 1-100% band and differential gap. Also available with 1-150% proportional band combined with automatic reset action. Bulletin No. 978. (A. W. Cash Co.)

CASH STANDARD TYPE 30
Diaphragm Control Valve (With Type 51 Mounted)

A rugged, dependable control valve—available in sizes ½" to 12" with various styles of inner valves—reverse or direct acting. Accurate control is assured when the Type 30 is used with 51 or 57 controllers, valve mounted as illustrated, or where the controller is installed remotely. Bulletin No. 980. (A. W. Cash Co.)

CASH STANDARD TYPE 57
Recording Controllers—

An air operated temperature controller with mercury, vapor, gas or organic liquid actuation. Temperature ranges from —350°F. to 1200°F. Available in 9" and 12" case size, spring or electric driven chart drive, on-off control or 1-100% proportional control.

All units have push button nozzle cleaner; proportional controllers also have sapphire jewelled relay orifice with push button cleaner. Bulletin No. 979. (A. W. Cash Co.)

WHAT'S YOUR TEMPERATURE CONTROL PROBLEM?

Cash Standard and Stacon have the answer or will find one.

Contact the Cash Standard temperature and pressure control specialist in your area, or write Dept. G.

CASH C S **STANDARD**

A. W. Cash Co. and Its Subsidiary, Cash Standard Stacon Corp.
P. O. Box 551, Decatur, Ill.

PRESSURE, HYDRAULIC, TEMPERATURE, PROCESS AND COMBUSTION CONTROLS

NEW EQUIPMENT & SUPPLIES

New Truck Has One-Piece Plastic Body

Unique one-piece construction of this plastic refrigerated truck body promises greater protection of perishables plus significant economies in operation, maintenance, and construction.

Known as Frigid-Van, the body is made by a new process in which sandwich structures of reinforced plastic and rigid-type insulation are formed in a one-piece molding operation. As a result, this construction may now be introduced in fields where full-scale application formerly was restricted by the size of the molding.

Thus, larger-size structures might well include refrigerated trailers or even railroad cars.

An important aspect of this process is that it permits the various materials to perform dual functions, which greatly increase their effectiveness.

For example, the reinforced plastic skin of the sandwich structure provides structural strength and added insulation, since it has low thermal conductivity. In addition, it acts as an exterior surface and protects the insulation. Also, this construction eliminates need for internal frames and braces.

Furthermore, use of plastic permits half the insulation thickness formerly required, a factor that allows about 20% greater load space. Moisture or vapor entry is curbed since insulation is hermetically sealed between sheets of plastic. And studies show that such moisture accumulation amounts to 400-500 lb. of additional weight after a few years.

Resistance of the plastic to odor absorption is another plus factor that protects product quality and eases sanitation.

Body maintenance is minimized since the plastic has high impact strength, and will not rust or corrode. Also, color can be molded into the body's exterior to eliminate need for painting. Repairs are inexpensive and quickly made by a simple patching process.

From a production standpoint, the new molding method offers cost savings by eliminating hand labor formerly required to fabricate individual sections and assemble them into final shape on conventional bodies.—*The Heil Co.*, 3042 W. *Montana*, *Milwaukee* 1.

Circle 113A on Reader Service Card

Advanced Design Marks New Fork-Truck Line

Rear-wheel gear drive and a compact high-pressure hydraulic system are significant design advances of a line of heavy-duty electric fork trucks. Capacities range to 7,000 lb.

Placing the drive at the rear gives truck (PowerMaster RR) maximum maneuverability, since it can pivot about a point on its center line rather than outside of one of the load wheels. Drive is powered by two traction motors with an electric differential. Entire assembly is spring-mounted for constant traction on both drive wheels at all times.

Advantages of new hydraulic system (2800 psi.) are that it uses more compact components and permits faster lift speeds. A 7,000-lb. load may be raised at 25 fpm, while no-load speed is 30 fpm.

Unit's roller-type mast gives a 130-in. lift with a collapsed height of

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83 in. Overall length of truck is 130⅜ in. with 36-in.-long forks. Overall width is 42 in. It right-angle stacks 48-in.-long loads in aisles only 142⅜ in. wide. Traction speed is 5½ mph. empty, 5 mph. loaded.

Trucks have four speeds forward and reverse with automatic acceleration and dynamic braking. Hydraulic brakes are within the load wheels and a "dead man" brake is located on the foam-rubber seat. There are no grease points since sealed bearings are used throughout, and all components are readily accessible for inspection and adjustment.—*Lewis-Shepard Products, Inc., Watertown, Mass.*

Circle 113B on Reader Service Card

Condensate-Return Units Boost Heating Efficiency

Shown above is the 40-gal. single unit of a new line of automatic condensate-return pumping systems designed to curb heat loss, scale formation, and corrosion in heating installations.

Applications include closed low-pressure steam heating, process equipment, and boiler-feed condensate return. Single or duplex units are available in receiver capacities of 7, 14, 40, 60, and 100 gal.

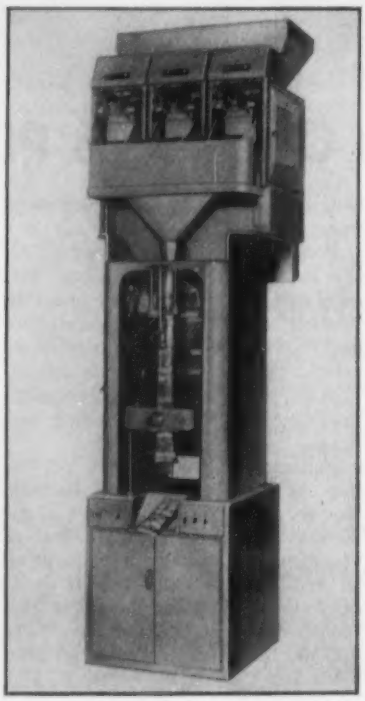
Straight condensate-return units consist of a receiver tank to which is connected a close-coupled centrifugal pump, bronze-fitted single stage. Latter is electrically controlled by a float switch actuated by rise and fall of water in receiver. Ceramic seat mechanical seals permit operation up to 212F.

Boiler feed condensate-return systems automatically blend raw makeup water with hot return condensate to maintain the water line in the boiler. Fresh water is supplied by a makeup valve attached to the receiver by a float housed inside the tank. This controlled compensation for loss of live steam or non-recoverable condensate permits even absorption of heat with minimum fluctuation in fire.

Duplex units have two pumps which, in straight condensate-return, alternate in operation to equalize wear. If condensate return is greater than one pump can handle, the second starts automatically. On boiler feed condensate return, operation is governed by a two-level boiler control that starts and stops both pumps in sequence.

No piping is required to attach 7 and 14 gal. receivers and pumps. Larger-capacity receivers are of welded sheet steel, mounted on supporting pedestals integral with the base.—*Goulds Pumps, 14 Black Brook Rd., Seneca Falls, N. Y.*

Circle 114A on Reader Service Card



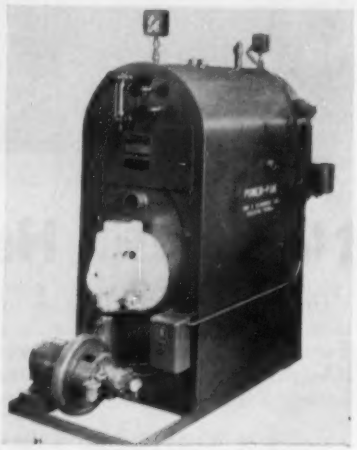
Forms, Fills, and Seals 60 Pillow Bags/Min.

Cost-cutting advantages of this new fully automatic unit may make its use practical even in the plant packaging as few as 3,000 bags per day. Known as Elec-Tri-Flex, it makes, fills, and seals up to 60 pillow-style (single or double wall) bags per min. from roll stock.

Unit normally is furnished with maker's net-weight scales, but can be equipped with either volumetric or auger feed, or for hand loading. Production depends on the rate at which the scales can weigh accurately, and not on the number of bag-making tubes. Hence, use of 2, 3, or 4 scales permits packaging speeds ranging from 20-25 per min. up to 60.

Design simplicity and ease of operation are additional advantages, while complete changeover of product and film size takes 10-20 min. Furthermore, scales can be fed either from overhead or from a waist-high, floor-type hopper—*Triangle Package Machinery Co., 6633-55 W. Diversey Ave., Chicago 35.*

Circle 114B on Reader Service Card



New Low-Pressure Boiler Has Many Applications

Smaller demands for steam or hot water, in the 10-20 hp. range, may be efficiently met with a new automatic low-pressure boiler for oil and gas firing. In addition, this package unit (Power-Pak) is suitable for auxiliary use in large plants and warehouses.

Designed to ASME standards of 5 sq. ft. of heating surface throughout its full range, it offers smokeless combustion and automatically responds to load changes. A compact forced-draft

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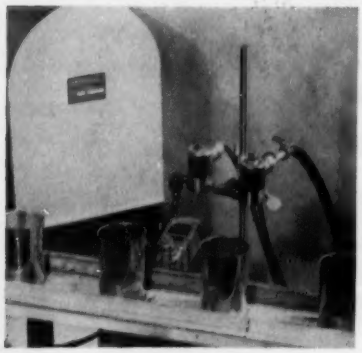
For your convenience, too, items in this department are listed and keyed in the Reader Service Section.

unit (no stack required), it is quiet and fast steaming.

The burner is mounted on the boiler, while ignition transformer is on the air plenum. On oil-fired models, a single motor drives both forced-draft blower and fuel pump. Safety valve, pressure control, and gages are easily accessible on top and at the side.

A 10-hp. oil-fired unit measures 61x34x66 in., and weighs 1,750 lb. The 25-hp. boiler is 86x36x74 in., weighs 2,800 lb. Gas-fired 10-hp. unit occupies 67x34x66 in., weighs 1,750 lb.; 25 hp., 92x36x74 in., weight 2,800 lb.—*Orr & Sembower, Inc., Reading, Pa.*

Circle 114C on Reader Service Card



Liquid Dispenser Handles 300 Containers/Min.

Processors will be interested in a new automatic dispenser that accurately delivers items such as saturated brine, aromatic oils, M. S. G., calcium chloride, sugar, and ascorbic acid. Precise dispensing of material eliminates waste, also corrosion of conveyors.

Ingredients may be added singly or in combination. Quantities range from one drop to several ounces at speeds up to 300 containers per min., according to volume dispensed. Either cans, glass, or paper containers may be filled.

Electronically-controlled unit (Electro-Portioner) operates with material continuously recirculated under constant pressure. Thus a constant volume is dispensed during a predetermined time interval. Its dispensing head is actuated by the moving container—on a "no can-no fill" basis—through a standard microswitch or photoelectric control.

Standard model has bronze pump with brass fittings, but unit is also available in 316 stainless. Weight is 60 lb. Dimensions: 19x13x19in.—*International Salt Co., Scranton, Pa.*

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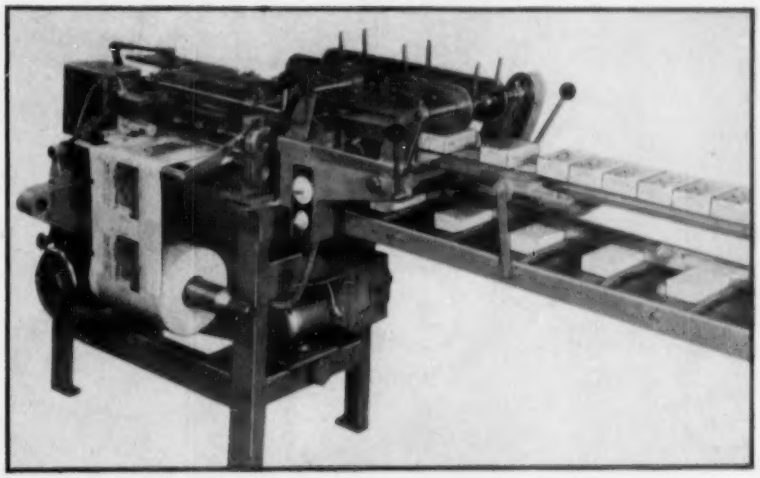


Carton Wrapper Redesigned for Greater Flexibility

This unit has recently been modified for greater range, increased production, and maximum versatility.

Called Model 49S Carton-Wrapping Machine, it wraps (with heat-sealing) cellophane, wax paper, and foil. Package range is 4-9 in. long, 2¼-4½ in. wide, and 1-2¼ in. high. Maximum speed is 45 per min.

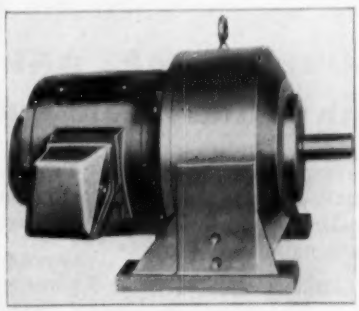
Operation is completely automatic from infeed to ejection. Wrapping material is fed directly from roll stock, while precise cutting for proper design register is controlled by electric eye. As product enters wrapping section, coordinated folders conform the wrapper to the package. Latter next passes through sealing heaters and belts, then to discharge conveyor.

For greater flexibility maker offers various accessories and attachments that:

- Automatically place cards or U-boards on each flight of infeed conveyor, ready to be filled by an operator.
- Load products directly into infeed-conveyor flights.
- Apply a tear-tape to package for easier opening.
- Label and code-date packaged products.

—*Hayssen Mfg. Co., Sheboygan, Wis.*

Circle 115B on Reader Service Card



New Gearmotors Built For Severe Service

Now available in both a.c. and d.c. from 1-60 hp., this line of gearmotors combines latest principles of mechanical gearing and motor development for superior performance under adverse conditions.

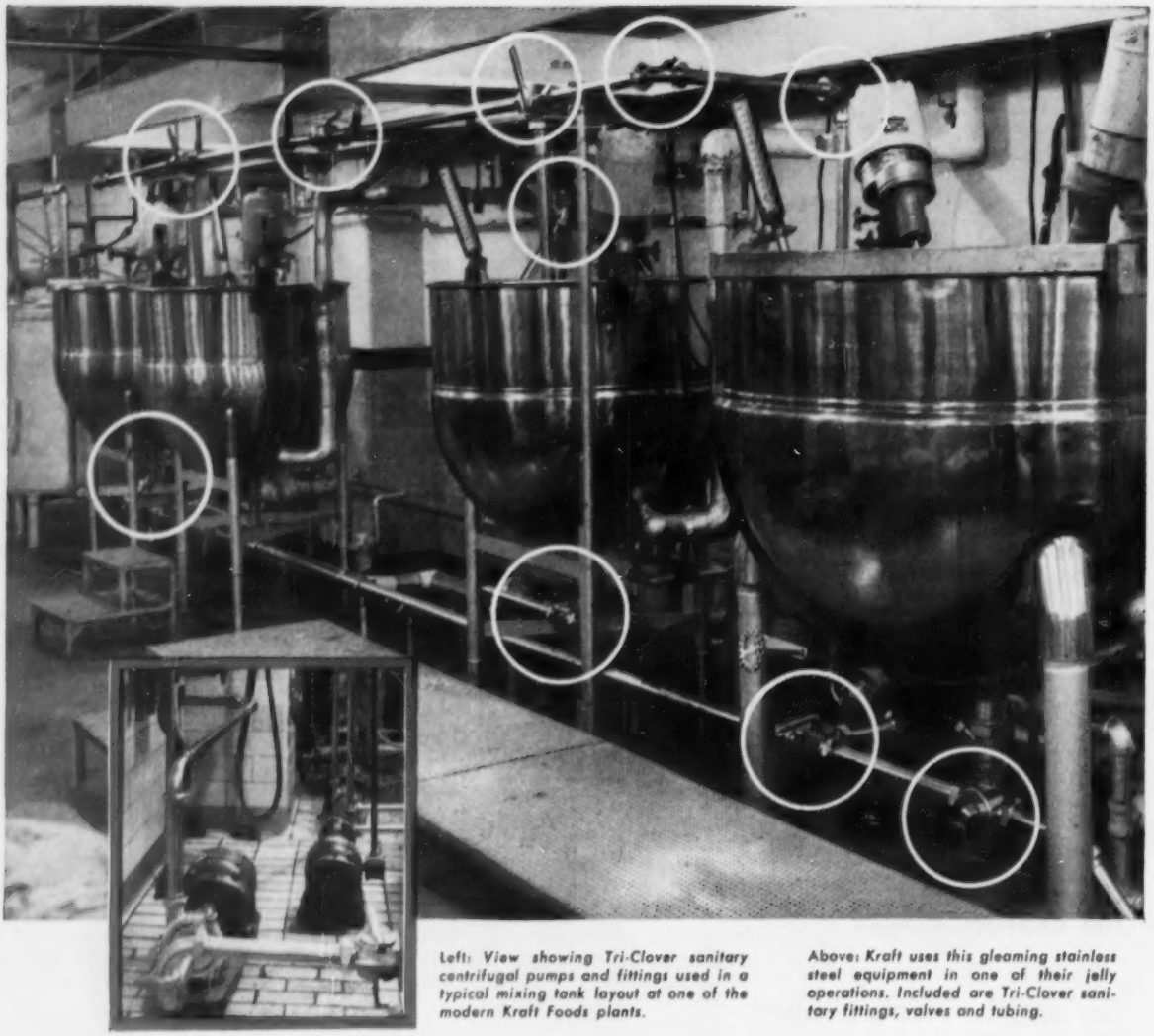
With 2-way seals that lock oil in and keep dirt out, units may be mounted in virtually any position without oil leakage. Induction-hardened tooth surfaces on alloy-steel gears provide strength and wear resistance. Also, the simple gear train has fewer parts to wear, less mechanical friction, and improved power transmission. A wide selection of mountings, enclosures, and ratios is offered for all applications.—*Reliance Electric & Engineering Co., 1088 Ivanhoe Rd., Cleveland 10.*

Circle 115C on Reader Service Card

Recording Thermometer Has 33-Day Cycle

With use of a new recording thermometer, processors can now have a 33-day continuous temperature record of perishables in storage or transit. Such data provide complete evidence of improper refrigeration in support of damage claims.

Furthermore, substantial savings are possible through prevention of overicing and by holding products at optimum temperatures.



Left: *View showing Tri-Clover sanitary centrifugal pumps and fittings used in a typical mixing tank layout at one of the modern Kraft Foods plants.*

Above: *Kraft uses this gleaming stainless steel equipment in one of their jelly operations. Included are Tri-Clover sanitary fittings, valves and tubing.*

TRI-CLOVER PUMPS AND FITTINGS

help maintain high sanitary standards for KRAFT FOODS

Kraft Foods Company has earned an enviable reputation for constantly high product purity and extremely high standards of sanitation in their many food processing operations.

To help maintain these high sanitary standards and to guard against product contamination, Kraft plants utilize many of Tri-Clover Division's sparkling clean stainless steel sanitary fittings, valves, pumps and tubing. For Kraft has found that Tri-Clover products embody highest quality materials and workmanship and have long met the most strict sanitary code requirements.

Why not let Tri-Clover fittings and pumps help to achieve new standards of efficiency and sanitation in *your* processing operations? Let our engineering staff help in solving your specific corrosion-resistant liquid conveying line problems. *Write for further information.*

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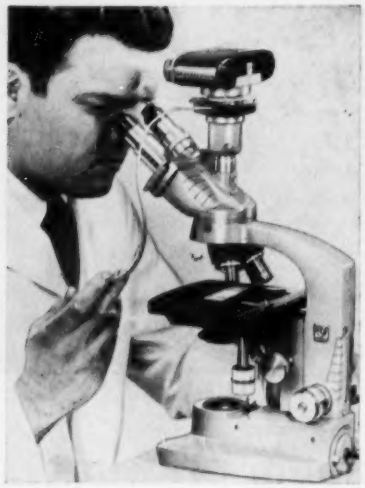
The spring-wound unit has a short pen arm and sturdy construction to withstand vibration and shock. It can be calibrated for any span of 100 deg. from −40 to 150F., and readings are traced on permanent tape. Instrument is protected by a self-sealing case.

Recorder is 6 in. high, has a 3-in. dia., and weighs 2¾ lb. It is available on a rental basis or for sale.—*Ryan Recording Thermometer Co., 851 Poplar Pl., Seattle, Wash.*

Circle 115D on Reader Service Card



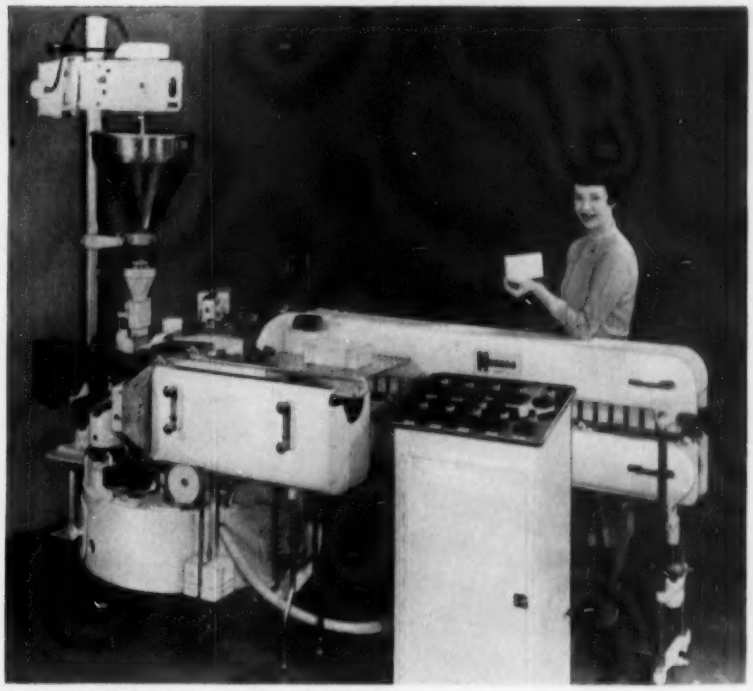
New Microscope Permits Efficient Observation

Advanced styling and design of a new line of compound microscopes offer maximum comfort for efficient viewing.

Included in the series (Microstar) are three interchangeable and reversible inclined bodies—monocular, binocular, and trinocular—that rotate 360 deg. Stage and specimen are focusable to the objective by low-positioned coarse and fine adjustments, thus body-tube height and eye level remain constant. Variable autofocus minimizes possibility of damage to objective and specimen. Both left- and right-hand mechanical stages are available, and all major adjustments are located in substage zone for easy manipulation.

A special model has a built-in base illuminator, a trinocular body, and an attached 35-mm. camera for on-the-spot color photomicrography—*American Optical Co., Instrument Div., Buffalo 15, N. Y.*

Circle 117A on Reader Service Card



Unit Packs New Product-Protecting Cartons

Employing a new type of heat-sealed carton for superior product protection, this machine packages a wide variety of foods—dehydrates, powders, liquids, granular products, and those with high fat content.

Cartons, made by a special system (Hermetet), have integral liners that may be odor-proof and/or grease-proof, air-proof, sift-proof, or moisture-proof, depending on type of liner. Because latter is part of carton, it does not collapse under normal filling pressure.

Unit (Hermic X) handles cartons ranging from 2x1⅛x3⅞ in. to 3¾x 2⅞x6⅞ in. Changeover takes 15 to 50 min. A wide choice of liners is available—polythene-coated paper, laminated aluminum foil, cellulose film, wax glassine paper, wax paper, glassine paper, grease-proof paper, coated aluminum foil, and sulphite and kraft papers.

Space inside lining is all used because closure is part of end seal. There is no waste space inside carton to accommodate folded over ends of lining, thus use of paperboard for the outside carton is desirable. Heat-sealed side seams of liner, as well as ends, provide all-around protection of contents. Furthermore, reclosing of cartons is termed simple and effective.

Unit is 9 ft. long and takes 34 sq. ft. of floor space.—*Gardner Board & Carton Co., Middletown, Ohio.*

Circle 117B on Reader Service Card

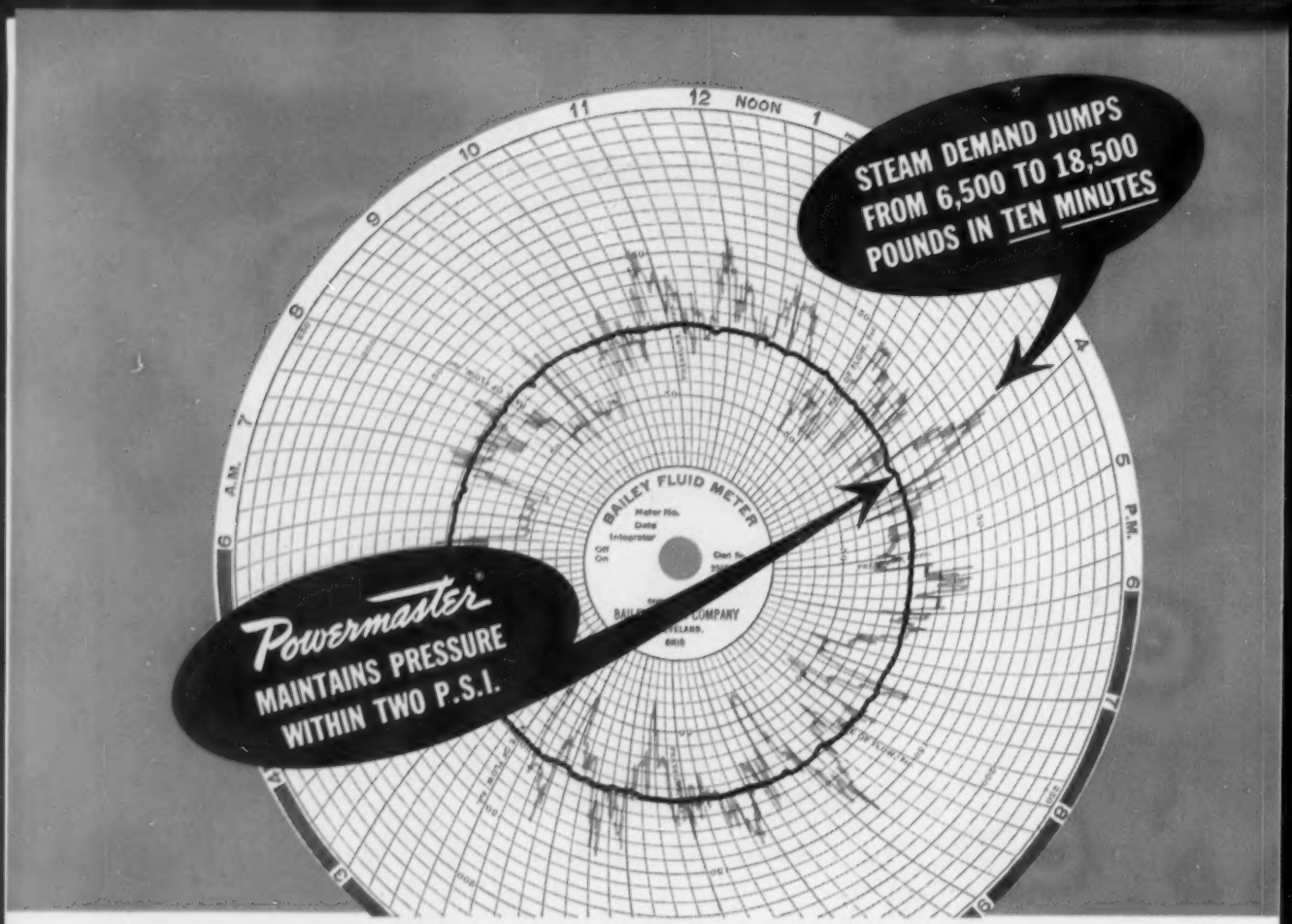
Plant's Heating Programmed by New Time Switch

Here's a device that automatically regulates the hours of building heating and divides the day into three heating periods.

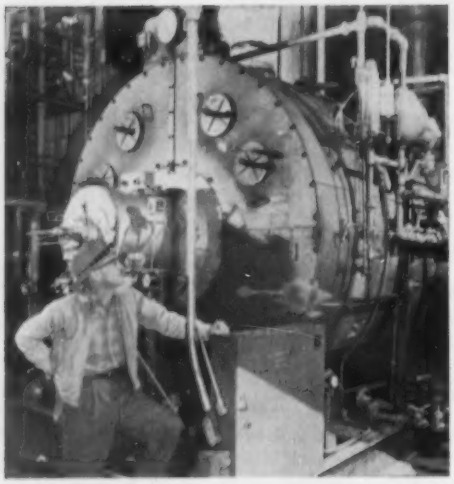
Known as Weather-Chron, instrument employs two switch circuits. The first operates the burner or valve, with only a safety high-limit controller in the circuit regulating heat generation or flow. Starting time of the morning buildup period changes automatically with outdoor weather changes.

At a pre-selected time, the second switch connects the "day time" heat-flow controller with the circuit to regulate heating throughout the day, then stops or reduces it at a given night-time hour. An added safety feature automatically eliminates "night setback" operation when outdoor temperature drops below a preset level. Also, all heating stops when outdoor temperature rises above a specified figure.

One-day or seven-day models are


STEAM DEMAND JUMPS FROM 6,500 TO 18,500 POUNDS IN TEN MINUTES
Powermaster MAINTAINS PRESSURE WITHIN TWO P.S.I.
BAILEY FLUID METER
12 NOON
A.M.
P.M.

Powermasters hold constant steam pressure against extreme load changes!



This 500 HP *Powermaster* Packaged Automatic Boiler solves two steam problems for a West Coast packing house—extra steam for processing, and more efficient off-season heating.

Four other *Powermaster* units have been installed by companies in the same area as a result of this successful installation.

This chart shows a typical 24-hour run for two 300 HP gas-fired *Powermaster* Packaged Automatic Boilers on which 100 psi steam demand varies from 3,000 to nearly 19,000 lb/hr. Note how they respond to wide and sudden load swings with virtually no variation in steam pressure. Even when the load *tripled* within a ten-minute period (see chart), only a 2 psi momentary pressure drop occurred . . . and was immediately recovered.

Uniform performance like this is a certainty for all users of *Powermasters*. Fully modulating O&S burner designs are the reason. By providing infinitely variable combustion control that instantly responds to load changes, high operating efficiency is maintained at all loads. This means fuel economy and freedom from maintenance due to incomplete combustion.

Have you checked your steam costs lately? Perhaps it will pay you to modernize with one or more *Powermaster* boilers. Write for Bulletin 1220.

Powermaster®

PACKAGED AUTOMATIC BOILERS

Sizes to 500 HP; pressures to 250 psi

ORR & SEMBOWER, INC.

Builders of Dependable Boilers Since 1885

Morgantown Road, Reading, Pa.

available. In the latter, hours of heating are adjusted individually for each day of the week. This permits earlier heat shut-off-times for Saturday and still earlier, or no heat at all, for Sunday, if desired. All units can be equipped with a clock motor containing a built-in spring that provides up to 30 hr. of carryover in case of current outage.—*Automatic Devices Co., 714 Hillgrove Ave., Western Springs, Ill.*

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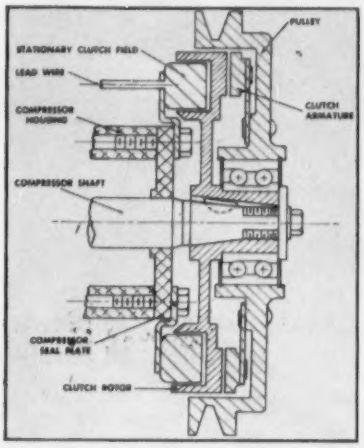


New Clutch Ups Efficiency Of Truck Refrigeration

A simple electro-magnetic clutch, which "freewheels" a belt-driven truck-refrigeration compressor when cooling is not needed, is seen boosting operating efficiency and cutting maintenance cost of such drive systems. Automatic control is easily achieved by use of a thermostatic control wired to the clutch.

Operating the compressor only when required offers the following advantages: It reduces load on the power source, makes for quieter overall operation, increases service life of drive system, and permits precise temperature control.

As shown in the diagram, unit consists of a stationary magnetic field mounted upon the compressor seal plate, and a rotor-armature-pulley assembly mounted on the shaft. Clutch rotor is keyed to the drive shaft, and armature-pulley assembly freewheels on a ball bearing mounted on rotor hub when unit is not energized. Assembly is driven by a V-belt from a gasoline engine or power takeoff.

When the thermostatic control calls for cold, the clutch field is energized electrically and rotor attracts the armature. This completes the magnetic circuit to drive the compressor. Response of the clutch is rapid because actuating force (electric current) is the same as the clutch motor force (magnetic flux). Complete engagement and release is simultaneous with actuation of the thermostatic switch.

There is no slipping or coasting because rotor and armature lock in full magnetic couple. Since clutch locks in any position, rotor and armature have full 360-deg. engagement. With no ratchet teeth, notches, or lugs to engage and clearances to take up, unit needs no adjustment and its service life is said to exceed that of any truck-refrigeration system on which it is installed.—*Warner Electric Brake & Clutch Co., Beloit, Wis.*

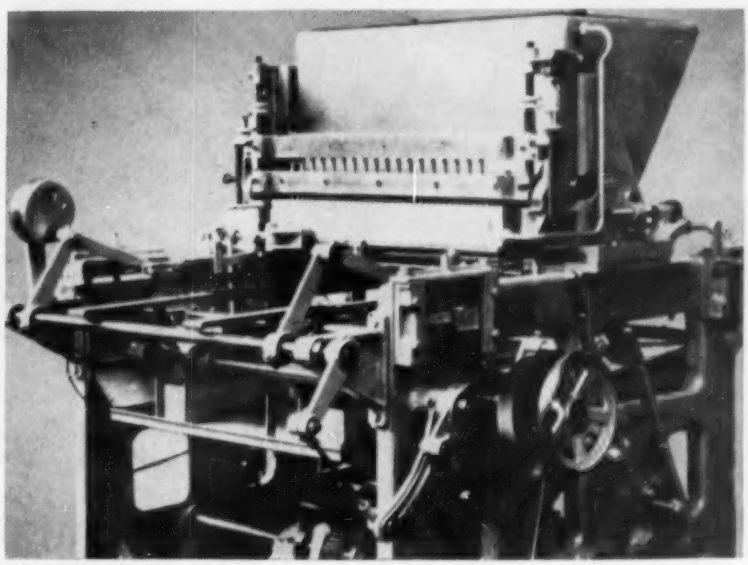
Circle 119A on Reader Service Card

Speed, Versatility Cited For Wet-Dry Pickups

All-purpose design of a new line of vacuum cleaners is said to bring speed and effiiciency to any wet- or dry-pickup. Called American Vacuums, units are offered in eight models with capacities of 3, 9, 12, and 55 gal. In addition to cleaning of floors they handle off-floor jobs (walls, ceilings, pipes, furnaces), special dust problems, spillage of flakes or granules, and water leakage.

Cleaners are available with choice of motors (¾ to 1½ hp.)—bypass, ventilated, or external bag type. Tanks are of blue or white enamel, porcelainized finish, or stainless steel. Hoses

Turn page



Forms Shell and Filling of Candy Simultaneously

Attractive confectionery may easily be produced with a new depositor attachment that automatically handles any combination of two ingredients moldable in starch. Called Dovo, unit will deposit such combinations as a marshmallow with a soft cream center, a fondant with a jam or jelly center, and a gum with a caramel center.

A single piston stroke simultaneously forms both filling and shell, which are deposited in impressions of starch-filled trays. And the filling is completely surrounded by the outer shell.

Weight of an item is adjustable, and proportion of filling can be varied up to 50% of the total. It can be placed toward the top of the shell, toward the bottom, or anywhere in between. Machine also deposits articles of two colors side by side.

Unit comprises a special stainless-steel hopper divided into two compartments, a pump bar with two rows of pistons, and adjusting and connecting elements. With the attachment fitted on maker's depositor, pump bars can still be used for items without fillings. Machine is made by A. Savy, Jeanjean, Courbevoie, France. American agent is *Jabez Burns & Sons, 11th Ave. and 43rd St., New York City 36.*

Circle 119B on Reader Service Card

now, Crucible low nickel stainless steels that meet many of your needs...

Here are two *new* Crucible grades, Rezistal type 201 and 202 that are similar in quality and properties to types 301 and 302 . . . but with desirable features all their own.

In the annealed condition, for example, Rezistal 201 and 202 have about 10% higher strength than 301 and 302, yet maintain almost identical ductility. This means that these grades can be fabricated with ease equal to their counterparts. In addition, their mill finishes and corrosion resistance to a wide variation of media compare most favorably with 301 and 302.

To sum up: Rezistal 201 and 202 have practically all the desirable properties of 301 and 302, *plus* some of their own. And they're available *promptly* in all forms. Write now for data sheets fully covering the properties of these new stainless grades. *Crucible Steel Company of America, Dept. AFE, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.*

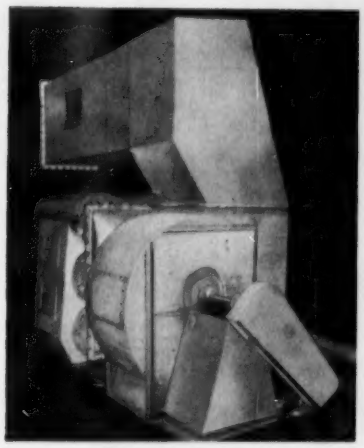
CRUCIBLE first name in special purpose steels

Crucible Steel Company of America

Canadian Distributor—Railway & Power Engineering Corp., Ltd.

(1¼ to 2 in.) may be rubber, Neoprene, or stretch-type.—*American Floor Surfacing Machine Co., Toledo 3, Ohio.*

Circle 119C on Reader Service Card



Ash Collector-Draft Unit Curbs Air Pollution

Designed to meet simultaneous needs for increased steam capacity and air-pollution control, this unit combines a highly efficient fly-ash collector and an induced-draft fan in an easily installed package.

Designated Regenerative Fly Ash Collector-Induced Draft Unit, it keeps stack discharge clean under all conditions and provides draft for boiler operation. Collector sector removes fly ash, soot, and cinders from stack gases. Low draft loss over the full-load range minimizes fan speed and power requirements.

Units, which can be used with new as well as existing boilers, are available in a range of capacities and in a number of arrangements to fit various conditions.—*Breslove Separator Co., Commonwealth Bldg., Pittsburgh, 22.*

Circle 121A on Reader Service Card

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For Efficient Fly Control: Insecticidal Cord

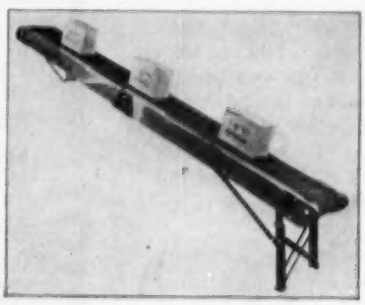
Ordinary cotton cords or tassels, colored bright red and impregnated with insecticide (Parathion), give the processor promise of summer-long fly control.

Since the insecticide itself is extremely toxic by mouth and skin contact, use of cords should be confined to areas away from exposed foods. However, there is little chance of contamination since the poison is sealed into the cord fibers, which are hung to avoid normal contact. Moreover, the active ingredient is very bitter and practically insoluble in water.

Known as "Fly Cord," product is packaged in convenient 100-ft. reels (each treating 333 sq. ft.) that permit stringing the cord overhead without being touched by hand. Installation is termed quick and simple, but cord must be hung according to a prescribed pattern. Two men can string a 30x60 ft. area in approximately 15 min.

Flies like to rest on such overhead cords, especially at night, and in doing so are killed by leg paralysis. Effects of the poison are cumulative. Tests indicate that effective fly control is attained in about two weeks after installation. Then, fly population is checked for up to 6 months.—*American Sanitation Institute, 884-886 Hodiamont Ave., St. Louis, 12.*

Circle 121B on Reader Service Card



Material Handling Eased By Light Belt Conveyor

There are a variety of uses for this light-weight, maneuverable belt conveyor—on stairways, as a booster on gravity conveyors, stacking, and loading and unloading of trucks and rail cars.

Of aluminum truss construction, unit has a total distributed-load capacity of 250 lb. It is 16 in. wide and comes in lengths ranging from 6-20 ft. Weight varies from 145-225 lb.

The 10-in.-wide belt (of non-slipping 3-ply duck) moves at 65 fpm., and there is a takeup adjustment at each end. All moving parts are enclosed to protect personnel. Sealed ball bearings keep friction loss low, and belt does not touch the floor in any inclined position, which permits minimum loading heights.

Units up to 12 ft. long are powered by ¼-hp. motors, ½-hp. for those 14-20 ft. long. Motors are 110/220v., 60

Nash Instrument Air Compressors deliver only clean air, free from oil or dust, and without filters

Here is Why!

You can dispense with oil filters and dust filters when you install ®Nash® Clean Air Compressors. You can save the cost of maintaining these devices. You can greatly reduce instrument maintenance costs. For the Nash employs no internal lubrication, therefore no troublesome oil is in the delivered air. Moreover, air from a Nash is thoroughly washed and cooled as it passes thru the pump. Dust in the plant atmosphere, even fly ash, is immediately removed.

®Nash® Clean Air Compressors are simple, with only one moving element. No valves, gears, pistons, sliding vanes, or other enemies of long life and constant performance complicate a Nash. No aftercoolers are needed. You will find it profitable to investigate these pumps, now.

No oil filters.
No dust filters.
No internal lubrication to contaminate air handled.
No internal wearing parts.
No valves, pistons, or vanes.
Non-pulsating pressure.
Original performance constant over a long pump life.
Low maintenance cost.

NASH ENGINEERING COMPANY
395 WILSON, SO. NORWALK, CONN.

cycle, single-phase. A 20-ft. power cord is supplied.—*The Colson Corp., Elyria, Ohio.*

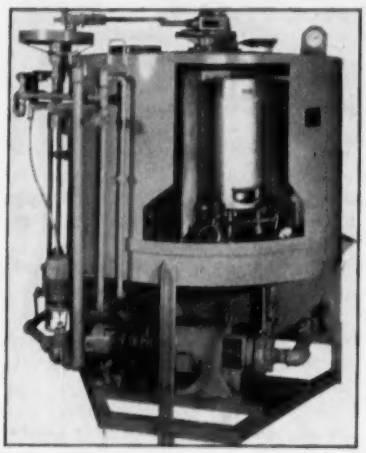
Circle 121C on Reader Service Card

New Cleaning Tool Eases Gage-Glass Maintenance

Employing a cloth swab on the end of a rod, this cleaning tool does an efficient job of removing particles and stains from the inside of liquid-level gage glasses.

In operation, a tubular swab is slipped over a piece of corrosion-resistant spring steel on the rod. Detergent is applied and rod is inserted into gage's end connection, or the drain in the offset of a valve. When swab is visible in the glass, pulling back a handle and tightening a thumb screw increases the spring's arc to force the swab against the glass.—*Jerguson Gage & Valve Co., 80 Fellsway, Somerville, 45, Mass.*

Circle 123A on Reader Service Card



Beverage Premix Tanks Washed at 50-100/Hr.

Offering easy loading, automatic operation, and variable speed, this compact rotary washer handles 50 to 100 premix containers per hr.

Known as "Red Circle", its six-compartment carriage is rotated by a ¾-hp. motor mounted on a sliding base. Washing schedule: Inside of containers and valves, two caustic pressure washes and two fresh-water rinses; the outside, one caustic pressure wash and one fresh-water rinse; covers, one caustic pressure wash and two fresh-water rinses. A 1½-hp. motor drives the wash pump.

The wash circuit is solenoid-valve controlled, and steam coils for high or low pressure are provided. Rinse water (city water, 30 psi. minimum at washer) is regulated by cam-operated whistle valves. A safety slip connection protects entire drive from overload.

Unit is 6 ft. high and 5 ft. 6 in. wide.—*Cherry-Burrell Corp., 427 W. Randolph St., Chicago 6.*

Circle 123C on Reader Service Card

Automatic Pricing System Speeds Prepackaging

Here's a new development—an automatic prepackaging scale that weighs, computes, and issues printed labels for random-weight items such as meat, poultry, and cheese. There are no readings or keyboard operations.

Known as Model 2000, system consists of three major components—scale, computer, and labeler—interlocked for accuracy and speed. These units are not mechanically joined, but are connected only by cables to provide installation flexibility. They operate with one cord and plug from the scale to any standard outlet (115v. a.c., 60 cycle, single phase).

Scale capacity is from 0-24.99 lb. Weighings are made to 1/100 lb. and Computer calculates the value directly to the nearest penny. Commodity prices may range from 1c. to $1.99 per lb. in one-penny increments. There are three price-setting dials—penny, dime and dollar.

A servo motor relieves the system of friction normally encountered in transmitting weight data to computer and labeler. Also, the weighing mechanism does not drive any printing device, a factor that increases its accuracy.

The electro-mechanical computer uses telephone switching relays. It multiplies weight and price per pound, then supplies the value to the printing unit or labeler. Latter ejects the computed label onto a thermostatically controlled heat-sealing labeler, or onto an alternate inner-wrap label-discharge chute. Labeler employs a NCR printing mechanism and commodity printing inserts.—*Hobart Mfg. Co., Troy, Ohio.*

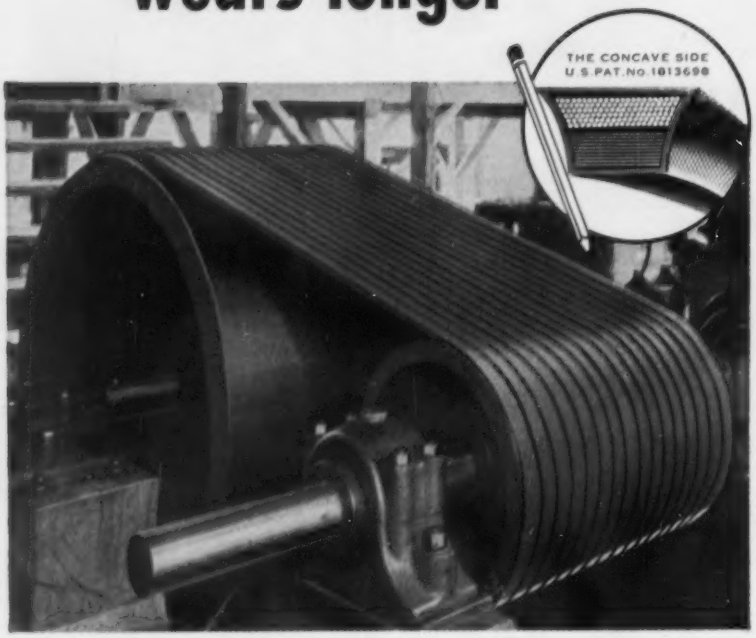
Circle 123B on Reader Service Card

Expandable Polystyrene—Versatile New Material

Molded in slabs, bricks, or sheets, expandable polystyrene is finding numerous uses. It is offered in lengths to 12 ft., widths to 4 ft., and thicknesses to 8 in.

As a low-temperature insulation (Uni-Crest), it offers light weight (1-20 lb. per cu. ft.), and low rates of heat transfer and water absorption. Typical applications: Cold storage or

Why a V-Belt with CONCAVE SIDES wears longer



It is easy to demonstrate to yourself why the concave sides (Fig. 1) of the Gates belt greatly lengthen belt life.

Simply bend a Gates belt and feel the sides. Notice how these precisely engineered concave sides *fill out* on the bend and *become straight*. Thus a Gates belt grips the sheave groove evenly (Fig. 1-A) and wear is distributed uniformly across each side of the belt. That means longer belt life; lower costs.

Make the same test with a straight-sided belt (Fig. 2) and see what happens. The sides bulge out on the bend (Fig. 2-A) concentrating the wear at points shown by arrows.

To assure longer wear and keep belt costs down, specify the V-belt with Concave sides—Gates Vulco Rope . . . readily available from nearby distributor stocks. The Gates Rubber Company, Denver, Colorado—*World's Largest Maker of V-Belts.*

Fig 2

Fig 2-A

There are Gates Engineering Offices and Distributor Stocks in all industrial centers of the United States and Canada, and in 70 other countries throughout the world.

TPA 90

Gates VULCO ROPE Drives

Equipment & Supplies

freezer rooms, cold lines, and refrigerated truck bodies and railway cars.

The insulation can be painted or coated with plastic or asphalt. It is odorless and resists vermin, fungi, rot, mildew, and dessiccation.

When laminated with wood, steel, aluminum, plastic or fibrous facings, it provides a strong, durable, and decorative paneling for interior or exterior walls. It is dimensionally stable and can be cut with a knife, hot wire, or ordinary saw.—*United Cork Cos., Kearny, N. J.*

Circle 123D on Reader Service Card

Fork-Truck Line Stresses Safety, Comfort, Efficiency

Increased operator safety and comfort, automotive-type controls, and faster operating speeds are advantages of a new line of gasoline-powered lift trucks. Three models on pneumatic tires offer capacities of 3,000, 4,000 and 5,000 lb.

For greater maneuverability, units employ trunnion steer wheels, short overall lengths, and minimum turning radius. Safety is accented by a long wheel base for added stability, also low center of gravity and seat height. Brakes, self-energizing in both directions, have a total effective area of 125 sq. in.

Superior operator visibility is provided through interlocking rolled channel uprights. Full-view controls, ample leg room, and adjustable operator's seat mountable from either side, add operating ease and comfort.

Load-lifting speed is 48 fpm. for the 5,000-lb.-capacity units, and 50 fpm. for smaller models. Forward speed is 13.8 mph. on all trucks. Quiet operation and ease in shifting result from use of constant-mesh transmissions.—*Hyster Co., 2902 N. E. Clackamas St., Portland 8, Ore.*

Circle 124A on Reader Service Card

Equipment & Supplies

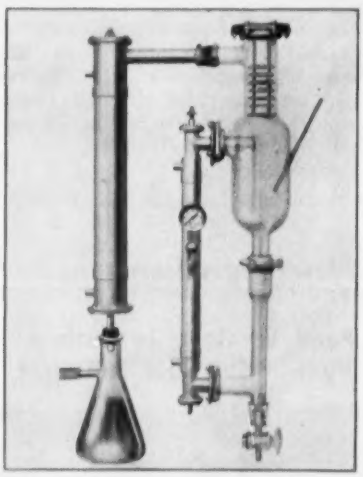
4-Unit System Produces Instant Milk Powder

Nonfat milk powder—instantly dispersible in either hot or cold water—is now being produced in a new 4-component system. Designated A-R-C-S Instant Solubility System, it employs an agglomerator, a re-dryer, a shaker-cooler, and a sizer to change the fine powder to soluble "clusters", which retain excellent stability, texture, and flavor.

In operation, powder entering the agglomerator is sufficiently wetted to cause clustering. A high-velocity air stream then carries it to a collector for transfer to the re-dryer by gravity. Here, product is dried to desired moisture content in a stream of hot air.

Next, clusters go to the shaker-cooler where cool air brings them to the proper temperature for sizing. In the sizer, product is continually fed through stainless-steel rolls to make uniform-size pellets for packaging.—*Cherry-Burrell Corp., 427 W. Randolph St., Chicago 6.*

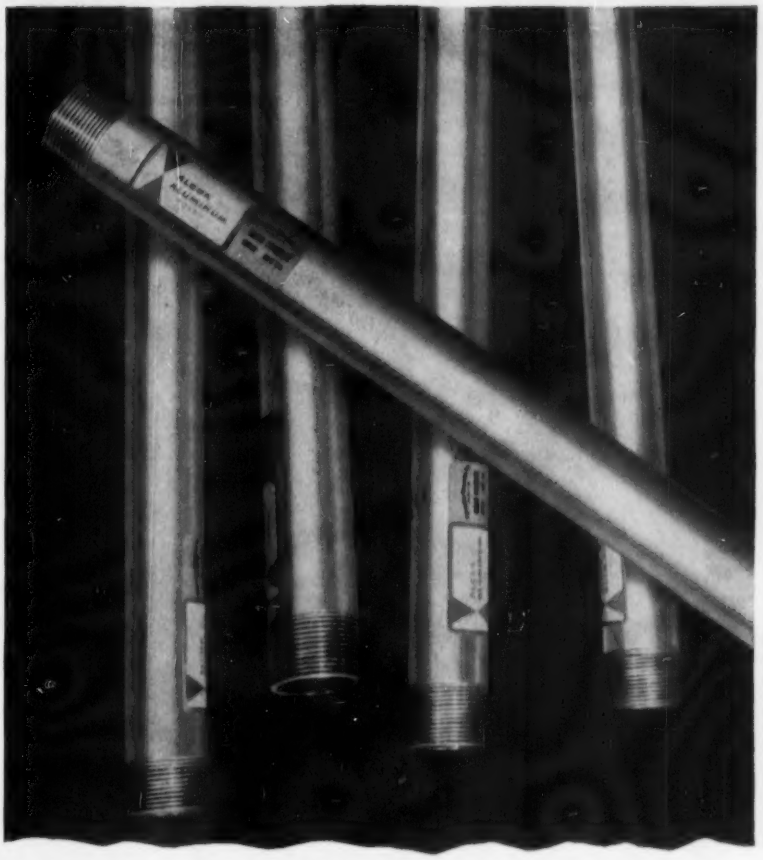
Circle 125A on Reader Service Card



Lab Evaporator Handles Heat-Sensitive Items

With an evaporation rate of up to 12 liters per hr., this high-capacity unit offers efficient concentration and separation of a wide variety of products—syrups, fruit juices, gelatin liquor, and wheat residues.

Known as Laboratory Evaporator, it quickly reaches operating temperature and is especially suited for thermolabile substances. Unit uses 4-psi. steam for low-temperature operation that prevents foaming or product



FIVE WAYS BETTER

ELECTRICAL RIGID CONDUIT, made by Alcoa, is better in five important ways . . .

1. Aluminum rigid conduit resists corrosion. It resists all kinds of attack, even in contaminated areas. Rarely needs painting, yet it outlasts all others . . . saves for the life of the installation.

2. It's nonsparking—you can safely use Alcoa® Aluminum Conduit in hazardous locations. And it bears the Underwriters' Laboratory approval.

3. It's nonmagnetic. This means less voltage drop. You can run longer lines or use smaller wires. You can separate conductors, regardless of load.

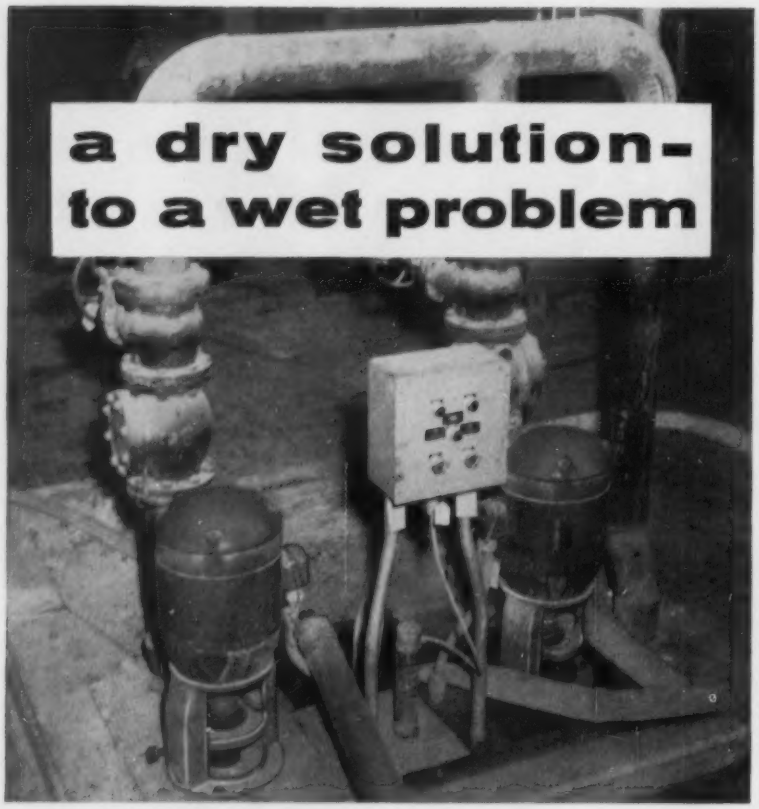
4. It weighs less. You save on installation, handling, storage, transportation.

5. It's good looking. The naturally bright finish of Alcoa Aluminum lasts . . . for there is no coating to peel or blister. You can use this conduit wherever good appearance is important.

Get the full story on Alcoa Aluminum Electrical Rigid Conduit from any Alcoa sales office. Or write Aluminum Company of America, 2328-H Alcoa Bldg., Pittsburgh 19, Pa.

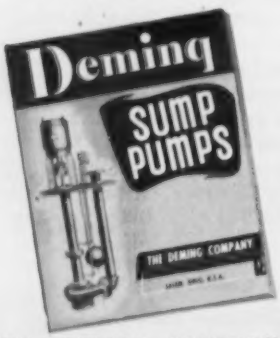
Your Guide to the Best in Aluminum Value

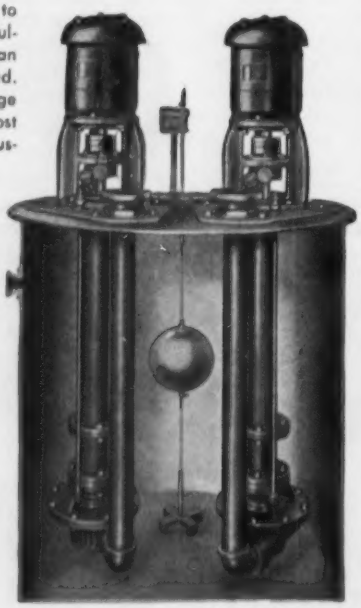
THE ALCOA HOUR
TELEVISION'S FINEST LIVE DRAMA
ALTERNATE SUNDAY EVENINGS



A large-volume user of water had a "wet plant problem." The solution is pictured above. Here you see two Deming Vertical Sump Pumps each with a 10 HP motor. Each pump has a rated capacity of 500 GPM with a 50-foot head. Unwanted water from all areas of the plant drains into a pit. When water in the pit rises to a predetermined level, one of the Deming Sump Pumps goes into action automatically. Or, if required, both pumps can be used simultaneously. If you have a "wet plant problem" there's a Deming Distributor near you to help you solve it.

Where conditions require two pumps to operate separately, in sequence, or simultaneously, Deming Vertical Sump Pumps can be furnished as Duplex Units as illustrated. The complete line includes a wide range of single and duplex units to meet most sump pump requirements. Write for illustrated BULLETIN 4500.





THE DEMING COMPANY
556 BROADWAY • SALEM, OHIO

Equipment & Supplies

decomposition, yet has rapid circulation.

Designed for panel mounting to save space, evaporator is made of stainless steel and Pyrex glass. Apparatus is non-corroding and requires only occasional flushing.—*Precision Scientific Co., 3737 W. Cortland St., Chicago 47.*

Circle 125B on Reader Service Card

Accurate Liquid Feeders For 1-800 CC./Hr. Range

A new line of liquid-metering devices offers accuracy to within ±0.25% for numerous applications in production and research.

Units (Micro-Feeders) are available in three models with feed rates ranging from 1-800 cc. per hr., discharge pressures to 2,000 psig. A single-stroke, positive-displacement instrument employing a screw feed and synchronous motor, it consists of a measuring-cylinder assembly mounted horizontally on a base plate. The plunger, coupled to a feed screw, is driven into the cylinder at a controlled rate, and a totalizer measures output in tenths or hundredths of a cc.

Operation is independent of variations in feed pressure or liquid viscosity. Standard equipment includes cylinder assemblies of 316 stainless and explosion-proof electrical equipment for hazardous locations.—*Proportioneers, Inc., 345 Harris Ave., Providence, R. I.*

Circle 126A on Reader Service Card

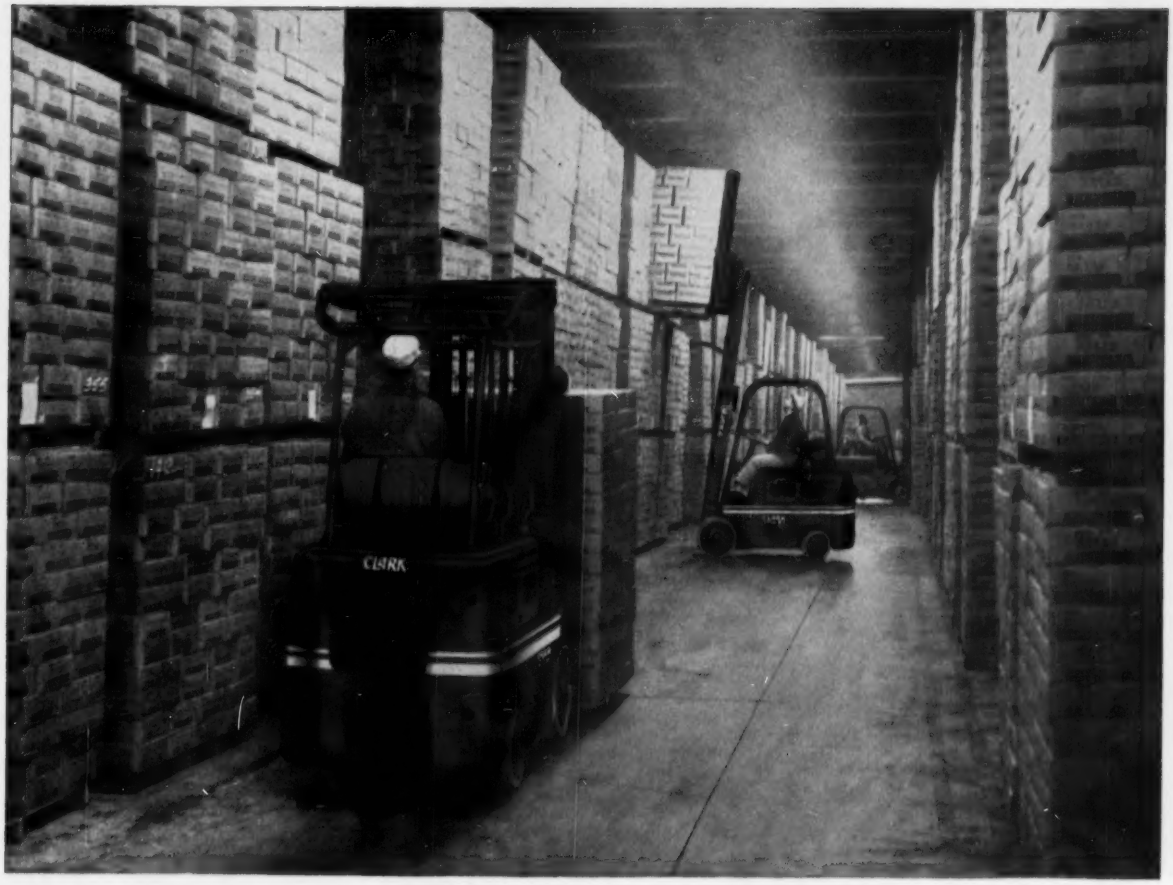
New Ingredients

Food Spoilage is Curbed By Mold, Yeast Inhibitor

Now available to processors is a new sorbic-acid compound that successfully inhibits mold and yeast growth in a variety of foods.

Designated Sorbistat, its antimycotic action has been evaluated in cheese and cheese products, pickles, fish, soft drinks, prepared gelatin fruit salads, potato salad, chocolate syrup, and cakes. Used in concentrations effective against mold and yeast spoilage, it does not affect appearance, taste, or odor of foods, nor does it retard normal microbiological curing of cheeses. FDA has found it safe for incorporation in films and other food-packaging materials.

A stable, easily stored, white crystalline powder that may be applied by



Gerber Products Company–

Handling food at lowest possible cost . . . via CLARK'S LP GAS!

Prerequisite to economical handling *methods* is low-cost *operation* of mechanical handling equipment. It's why Gerber Products Company has turned to Clark's LP Gas.

LP Gas is a *dry* fuel that burns clean with nearly perfect combustion. It leaves no carbon or lead deposits, does not dilute cylinder lubricants. Because of this, overall maintenance is kept at a minimum—down time and overhaul time is greatly reduced—the operation remains fume free.

Then consider Clark's factory installed LPG system—completely sealed with hydrostatic pressure relief valve and self-sealing couplings. Safety features include vacuum switch and solenoid which automatically lock off fuel flow when ignition is off or when engine stalls. And Clark offers a complete line, all U-L approved, in capacities from 2000 to 7000 lbs.

There's no question as to the value of LP Gas in a food operation. The question is, what *you* are going to do about it. Let your local Clark dealer fill in the details. You'll find him listed in the Yellow Pages under "Trucks, Industrial."

A BETTER BUY WITH LOCAL SUPPLY—*Genuine Clark Parts*

CLARK® EQUIPMENT

Industrial Truck Division
CLARK EQUIPMENT COMPANY
Battle Creek 14, Michigan

For more data, circle this page number on card at front →

"This Scale Check Chart showed us how to get Better Cost Control"

It's New from TOLEDO— send for yours today!

Your scales are a vital element in effective cost and quality control. Errors in weighing go all the way through accounting and affect cost . . . profit . . . or loss! You need to look at *all* your weighing today . . . not as isolated scales, but as a *weighing system.*

Toledo's new Scale Check Chart will show you quickly and accurately how well your scales are serving you, and provide the information you need for truly effective cost control.

This new Check Chart is yours for the asking in a handy kit that contains all you need for an easy, informative appraisal of weighing in your plant. Send for it today. Address Toledo Scale Company, 1404 Telegraph Rd., Toledo 1, Ohio.

On Your Scales . . . Material Becomes Money!

TOLEDO®
HEADQUARTERS FOR SCALES

New Ingredients

dusting, it can also be added to foods as a solution of sodium sorbate, effectiveness of which is equal to that of the acid.—*Chas. Pfizer & Co., 630 Flushing Ave., Brooklyn 6, N. Y.*

Circle 126B on Reader Service Card

Versatile New Flavoring: Lemon-Juice Crystals

The flavor, taste, and acidity of fresh lemon juice are said to be retained in a new crystalline product.

Known as Instant Lemon Juice Crystals, item is made by a special drying technique that removes only water. Its use enhances the flavor of fruit, juices, carbonated beverages, and dry mixes. Moreover, it is an effective antioxidant for frozen foods, and inhibits mold growth due to its acidity.

Instantly soluble in cold water, 13 oz. will make 1 gal. of single strength lemon juice.—*Jay Food Processing Co., 13-15 Malvern St., Newark, N. J.*

Circle 128A on Reader Service Card

Weather Conditioner Ups Shelf-Life of Candies

Quality of candies and salted nuts may be retained under hot, humid conditions by use of a new hardener and weather conditioner.

A pulverized vegetable product (Setsquick), it provides a hard, glossy coating that seals out moisture to prevent sticking to the wrapper or to fingers. Material may be used as a dusting powder or added to a cooked batch. Typical applications: Brittles, caramels, chewy and hard candy, ice cream crunch, and candied popcorn.

Furthermore, this material can be used as a slab conditioner and to prevent sticking in metal or rubber molds.—*Henry H. Ottens Mfg. Co., 129-131 S. Front St., Philadelphia 6.*

Circle 128B on Reader Service Card

New-Type Potato Starches Up Quality, Cook Faster

If starch is a component of your product, you will be especially interested in the quality-improving, and quick-cooking properties of new potato-starch derivatives.

Called Arogums, they are made by a new oxidation process that offers

New Ingredients

these advantages: Larger granual size, lessened set-back (reversion to original gelation after cook), and narrower limits of viscosity variation. As a result, they can improve stabliity, taste, texture, and appearance of many items.

Furthermore, their chemical nature often permits cutting the temperature and time of cook required to develop proper viscosity. Cooks as low as 150F. and 10 min. are possible.

Products can be supplied to meet specifications of maximum viscosity, and constancy or variation of viscosity with continued cooking and subsequent cooling. They are shipped dry in 100 lb. multi-wall paper bags.—*Morningstar, Nicol, Inc., 630 W. 51st St., New York City.*

Circle 128C on Reader Service Card

New Chemicals

Additive Permits Brighter Caustic Wash Bottles

For more efficient washing of bottles with caustic soda, this new liquid additive combines the action of sequestrants, wetting agents, and soil dispersants.

Called T-Kal, it is designed to correct a number of bottle-washing difficulties—scale and aluminate buildup, heat losses, bottle rust rings from old crowns, label trouble, solution breakdown, and heavy carry-out. All ingredients are stable to heat and caustic. Concentrations of additive, available in 55-gal. drums, vary from 1-4 pt. per 100 gal. of washing solution.—*DuBois Co., Cincinnati.*

Circle 129A on Reader Service Card

Liquid Coating Guards Asphalt Surfaces

Asphalt driveways and parking lots may be preserved with a liquid designed to provide an impervious seal over new or old surfaces.

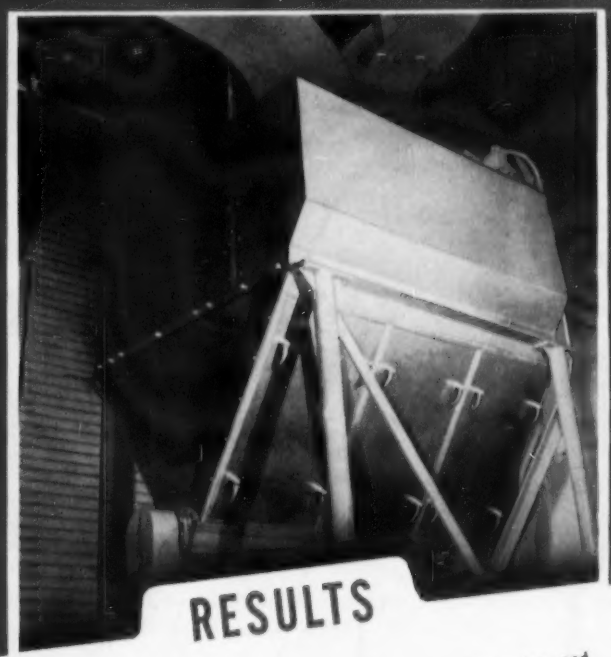
Called Jennite J-16, it forms a waterproof black finish that resists frost damage, abrasion, oxidation, solvent action of gasoline and oil, and drying effects of the sun. Applied by brush, squeegee, or distributor truck, material is available in 5-gal. pails or 30 and 55-gal. drums.—*Maintenance, Inc., Worcester, Ohio.*

Circle 129B on Reader Service Card

DUST RECOVERY with ENTOLETER®

SIMON SUCTION FILTER

Dust Collector...



RESULTS

PROBLEM:
To collect fine air-borne material missed by 2 cyclone separators and to provide suction for screw conveyors and storage bins.

MATERIAL:
Mixture of sugar, cocoa and flavoring.

SOLUTION:
Installed 3 section Simon Suction Filter Dust Collector, connection piping and exhauster.

RECOVERY:
All recovered material is discharged directly back into process.

This ALL-ALUMINUM equipment is newly designed and streamlined to meet requirements of the Food Processor. Each section contains 190 sq. ft. of filter surface—highest cloth area for unit of floor space required. We will recommend Simon dust recovery equipment to meet your requirements, and you may install it yourself . . . OR we will engineer and supervise complete installation.

The Trademark "ENTOLETER" is your guarantee of complete satisfaction

ENTOLETER DIVISION
SAFETY INDUSTRIES, INC.
Formerly The Safety Car Heating and Lighting Co., Inc.
P.O. Box 904 New Haven 4, Conn.

The Secret* of Good Taste

MSG

99+% Pure Mono Sodium Glutamate Crystals

Mysterious as it is, there is no denying that mono sodium glutamate has the property of making many foods taste better. ***MSG*** is fast becoming an indispensable ingredient in the processing, preparation, and serving of quality foods.

The Great Western Sugar Company, with 50 years experience and research in the food industry, invites you to discover "The Secret of Good Taste."

Try this new ***MSG*** *in: vegetables, meats, canned soups, poultry, seafood, sauces, gravies, seasonings, and frozen foods.*

A Product of
AMERICAN AGRICULTURE

We invite inquiries from current and prospective users of MSG

THE GREAT WESTERN SUGAR COMPANY
Denver, Colorado

New Chemicals

Potent Feedwater Agent Now Safer to Handle

Feedwater for low-pressure boilers may now safely be treated with a non-flammable form of hydrazine, a powerful oxygen scavenger and corrosion inhibitor. Formerly, handling precautions limited use of hydrazine to large installations, such as power-generating stations.

The new product (Scav-Ox) is a 35% water solution of hydrazine that has no flash or fire point. As a result it is shipped in lighter 30-gal. and 6½-gal. non-returnable containers.

In addition to high deoxygenating capacity, which minimizes amount of additive required, this agent does not introduce solids that would build up on heat-transfer surfaces to cut boiler efficiency. It further improves heat transfer by reducing ferric-oxide scale to magnetic iron oxide. And it contributes desired alkalinity through partial breakdown to ammonia.—*Olin Mathieson Chemical Corp., 460 Park Ave., New York City 22.*

Circle 131A on Reader Service Card

Quick-Setting Compound Fills Ruts in Concrete

Small ruts, holes, or cracks in concrete floors can now be filled with a quick-setting compound that permits resumption of traffic with minimum delay.

Called Stonfil, it hardens in 30-40 min. at room temperature, and within an hour in freezers or cold-storage rooms. Product may also be used for anchoring bolts or hand rails in concrete bases. It is mixed with water, poured, and troweled. No primer is needed, and material can be applied in thicknesses down to ¼ in.

Compound can be stored indefinitely in a dry area.—*Stonhard Co., 1306 Spring Garden St., Philadelphia.*

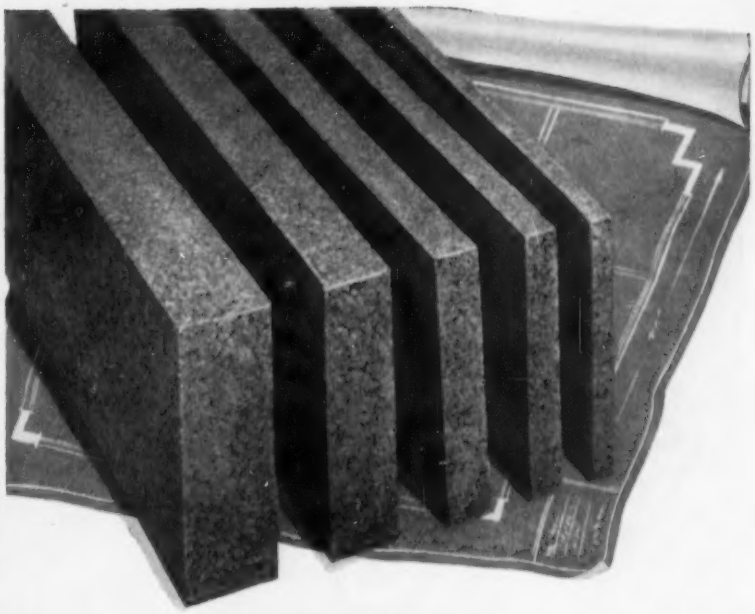
Circle 131B on Reader Service Card

Easier Handling Reported For Granular Detergent

Seen improving efficiency of food-plant sanitation is a new granular detergent that has been made dustless for easy handling.

Designated Raydex, it also incorporates non-ionic and anionic wetting agents to boost detergent action. Material is available in 125- and 350-lb. drums.—*Pennsylvania Salt Mfg. Co., 3 Penn Center Plaza, Philadelphia 2.*

Circle 131C on Reader Service Card



THE BEST INSULATION IS CORK
THE BEST INSTALLATION IS UNITED

TIME TESTED—Inspection of United Cork installations after 10 to 20 years service has shown the insulation to be as good as new—no deterioration—no loss in insulating effectiveness.

JOB-PROVEN—Many of United's orders in the last forty years are repeat orders from a wide range of satisfied cork users because of its JOB-PROVEN record.

LONG-LIFE—LOW COST—United's BB Corkboard is durable and retains its insulating properties—it costs you less in the long run.

PATENTED DESIGN—United BB (block-baked) Corkboard is specifically designed for low temperature installations. It's all cork without added fillers or binders. The straight edged slabs of corkboard fit accurately, bond readily, and are easy to install.

UNITED'S COMPLETE INSTALLATION SERVICE—Our skilled erection crews, located at each of our branch offices can handle your complete installations. Avoid delays and improper applications of insulation by using United's experienced design and installation service.—Use the coupon below for additional product information and installation data.

Corkboard

Pipe Covering

Tank Lagging

UNITED BB CORKBOARD

Manufacturers and erectors of cork insulation for almost a half century

UNITED CORK COMPANIES
2 Central Ave., Kearny, New Jersey

UNITED CORK COMPANIES, 2 Central Ave., Kearny, N.J.
Please send United Cork Catalog. I am interested in
NAME
FIRM
ADDRESS
CITY ZONE STATE

Engineering and installation offices, or approved distributors, in key cities—coast to coast.

"People often are hoggish about paper towels"

WITHOUT realizing it they'll use from two to four single fold towels just for drying.

—wasting as much as 40 inches of paper toweling.

But you can control this waste.

With savings up to 40%!

How?

By installing WESTROLL TOWELS in West Micromatic Cabinets.*

PEOPLE quickly unroll as little or as much as they want. But without realizing it they take less. Averaging 17 inches of soft, absorbent WESTROLL.

Saves janitors' time, too.

—one filling of the tamper-proof cabinet equals four of a single fold towel dispenser.

—there's less litter to clean up.

And washrooms are cleaner, neater.

LET a West representative tell you more about WESTROLL's washroom economies. Just write. Or telephone your local West office.

**Cabinets are loaned.*

OLDEST AND LARGEST COMPANY OF ITS KIND IN THE WORLD

75th ANNIVERSARY WEST DISINFECTING Company

FREE FOLDER

Use your business letterhead to request our folder on cutting towel costs with WESTROLL.

WEST DISINFECTING COMPANY
Dept. B, 42-16 West St.
Long Island City 1, N. Y.

Branches in Principal Cities • In Canada: 5621-23 Casgrain Avenue, Montreal

Briefs . . .

Produce-Treating System employs twin chemical pump to meter chlorine and "energizer" solutions into water supply. Portable unit with automatic controls is encased in 24x54-in. stainless-steel cabinet.—*Tri-Pak Machinery Service, Inc., Harlingen, Tex.* (132A)

Sensitive Liquid-Level Control, for minimum height of ⅜ in., uses diaphragm operated by air pressure in immersed cup-shaped bowl.—*Henry G. Dietz Co., 12-16 Astoria Blvd., Long Island City 2, N. Y.* (132B)

Suspended Separation Magnet, for use with conveyor systems, removes imbedded tramp iron from material flow to guard product purity, prevent machine damage.—*Stearns Magnetic, Inc., 670 S. 28th St., Milwaukee 46.* (132C)

Pocket Microscope, about the size of a fountain pen, enlarges objects 50 times for close-up inspection. It's focused just by tilting, while a metal reflector throws light on subject.—*Edmund Scientific Corp., Barrington 13, N. J.* (132D)

Round-Container Labeler handles units from 1¼ oz. to gallon jugs without special attachments. Machine applies spot, face, or wrap-around labels at speeds up to 60 per min. on glass, tin, or fiber containers.—*Labelette Co., 2611 W. Leland Ave., Chicago 25.* (132E)

Automatic Remote Alarm provides both audible and visible warning of abnormal process functions. System, employing a 2-wire pair or single wire and ground return, is actuated by any condition that will operate a switch or relay.—*Sparks-Withington Co., Sparton Control Systems Div., Jackson, Mich.* (132F)

Gas-Fired Incinerator, an automatic 4-bu.-capacity unit, uses an atmospheric ribbon-type flame burner for efficient operation. It is approved for use with various gases—natural, manufactured, mixed propane, and LP.—*Bowser, Inc., Incinerator Div., 1335 W. Randolph, Chicago.* (132G)

Tube-Filling Machine, operating at 80-100 per min., offers pneumatic cleaning, cap tightening, photoelectric registration, and various coding and crimping methods. Unit handles tubes up to 1¼ in. dia., 7¼ in. long—*Arenco Machine Co., 25 W. 43rd St., New York City 36.* (132H)

Equipment Applications

Sanitary Bacon Slide Is a Space Saver

This stainless-steel spiral slide provides Armour & Co. with an efficient, space-saving method of transporting bacon sides from the third-floor cutting room to the first floor curing cellar at their Herr's Island Plant, Pittsburgh.

The 23-ft. unit (Allegheny-Ludlum Steel Corp., Pittsburgh 22) is easily cleaned, corrosion resistant, and strong. Built around a 9-in. center post, it is made of pie-shaped sections riveted together, and an 8-in. side welded on. Floor space required is only 5 sq. ft.

Unit takes 2,200-2,800 slabs a day. Meat's rate of descent is controlled by flow of a thin trickle of water that acts as a lubricant.

Circle 133A on Reader Service Card

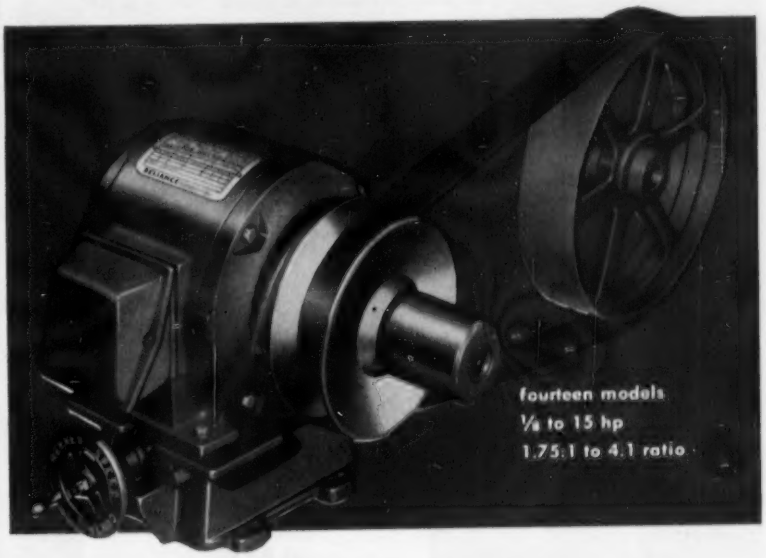
Rail-Car Spotting Sped By Two-Way Puller

Spotting of freight cars on rail siding has been made simpler, safer, and less costly at Corn Products Refining Co., Pekin, Ill.

Employed is an improved two-way, double-drum car puller (Jones Machinery Div., Hewitt-Robbins, Inc., Stamford, Conn.) that permits one operator to move up to 14 loaded cars by pushbutton. It consists of two cable drums driven by an electric motor through a gear reducer and a reversing mechanism. One end of a long wire rope, guided by sheaves that conform to track layout, is fastened to one drum. Cable's other end is fastened to the second drum.

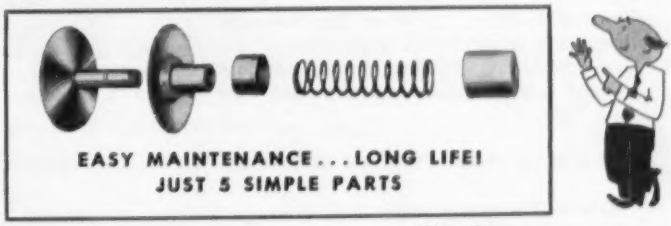
At mid-way points in the cable

The low-cost answer to wider use of your machines

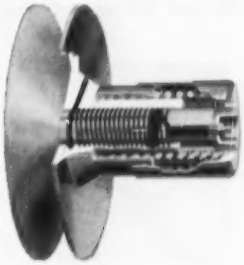


REEVES
Vari-Speed Motor Pulley

Add the advantages of accurate variable speed control to your existing machinery with this compact unit. Add versatility and extended life... handle more shapes, sizes and materials!



REEVES "Close-grooving" —a special lubrication system—insures free sliding disc for easy speed changes.



For bulletin complete with rating charts and dimensions, write Dept. FE21a-V545.

REEVES DIVISION • COLUMBUS, INDIANA

RELIANCE ELECTRIC AND ENGINEERING CO.

WELDED STAINLESS STEEL

TUBING and PIPE

Producing stainless steel tubes and pipe of the highest uniform quality takes the finest modern equipment. And, at Wallingford, whenever there is a better machine or a more advanced quality control device, it is obtained and integrated into our manufacturing operations.

But other less tangible factors . . . equally essential to highest product quality . . . can be supplied **only** by the expert judgment and skilled hands of experienced artisans. For this reason, personnel at Wallingford is a picked team of engineers, metallurgists and production specialists who work together to produce the finest.

FOR A BETTER PRODUCT, DELIVERED ON SCHEDULE, CALL ON WALLINGFORD.

Welded Ornamental, Mechanical, Pressure; Sanitary, Aircraft and Shaped Tubing and Pipe from ⅛" to 3" OD

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WALLINGFORD
STEEL CO.
WALLINGFORD, CONN. U.S.A.

Write today for new booklet . . . "WALLINGFORD QUALITY TUBING AND PIPE"

STAINLESS • ALLOY • HIGH CARBON • LOW CARBON • STRIP AND TUBING

Equipment Applications

along each track are "bull" rings to which short lengths of cable-carrying car hooks are attached. In operation, the hook is simply slipped over a car sill or through the conventional coupling, and puller is operated forward or reverse to move car in either direction.

Circle 133B on Reader Service Card

Special Trucks Ease Multi-Stop Delivery

A fleet of trucks with walk-in cabs and special 9-ft. refrigerated bodies is simplifying multi-stop retail service for Scott Petersen & Co., Chicago sausage maker.

Units (FM-150, International Harvester Co., 180 N. Michigan Ave., Chicago 1) hold a temperature of 35 F. Short overall length (134-in. wheel base) and low turning radius make for easy handling in traffic. Furthermore, truck's interior construction and shelf arrangement offer efficient loading of items of different size and shape.

Circle 134A on Reader Service Card

Refrigeration Cost Is Cut By Dry-Coil Condensing

To save water and maintenance costs for their 80-hp. refrigeration system, Delvale Dairies, Inc., of Baltimore, has changed from wet- to dry-coil condensing.

Employed is an air-cooled condenser (Unicon) and an automatic hot-gas defrost system ("L" Thermobank) made by Kramer Trenton Co., Trenton, N. J. This installation keeps a 97 x 28 ft. ice cream room at −20 F. for handling 1,500 dozen specialties per hr. The roof-mounted condenser maintains proper head pressure in an outside temperature range of 100-0 F.

Circle 134B on Reader Service Card

Pneumatic Conveying Ups Solids-Handling Efficiency

Air-conveying of malts and grits from box cars to storage bin is cutting materials-handling costs at Duquesne Brewing Co., Pittsburgh.

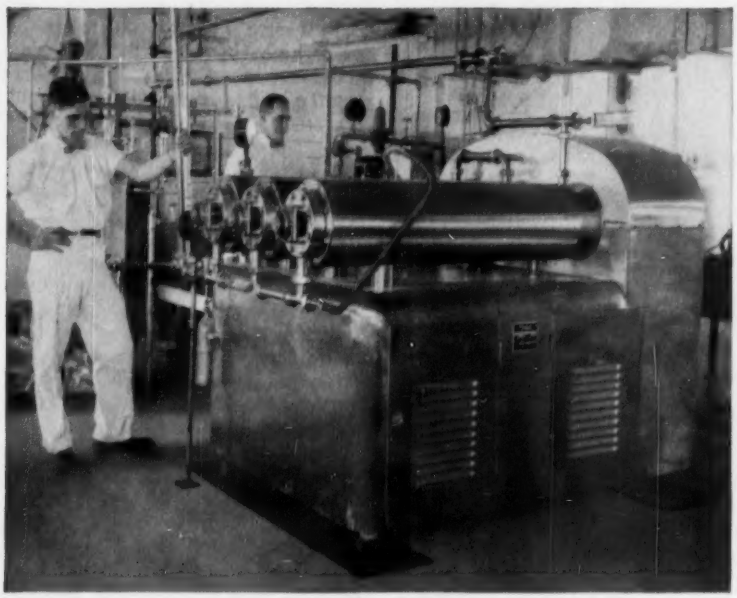
System (Airveyor, Fuller Co., Catasauqua, Pa.) is automatically controlled from a remote pushbutton panel. It is also used for moving stored material from bins to process areas. Feed and flour mills, bakeries, and starch factories are among other plants turning to this method of bulk handling dry pulverized and granular materials.

Circle 134C on Reader Service Card

"We cut operating costs as much as 50%...
produce better, longer lasting gums and jells...with

VOTATOR®

CONTINUOUS PROCESSING APPARATUS"



Processing rate with this installation at George Weston Ltd., Brantford, Ontario, can be varied from 1200 to 4500 pounds per hour.

Famous Weston's candies are now produced continuously, in a closed system, with VOTATOR* Processing Apparatus. By replacing batch methods, Weston reports remarkable savings in labor costs, and in steam for cooking and heating in drying rooms. Loss of flavors and colors from evaporation has been eliminated. Thus, operating costs have been reduced as much as 50% on some lines!

At the same time, efficient VOTATOR Processing Apparatus improves quality and sales appeal of product. Precise, automatic control maintains uniformity. Gums can be made very tender for special packing, or made firm for bulk handling. They are clearer . . . have greater shelf life . . . colors are more brilliant. Gums develop no crusting, improving ease of sugar coating.

Investigate VOTATOR Continuous Processing Apparatus for cooking, cooling, or other processing of *your* confectionery products. Write The Girdler Company, Votator Division, 224 East Broadway, Louisville 1, Kentucky.

USE EFFICIENT VOTATOR CONTINUOUS PROCESSING APPARATUS FOR

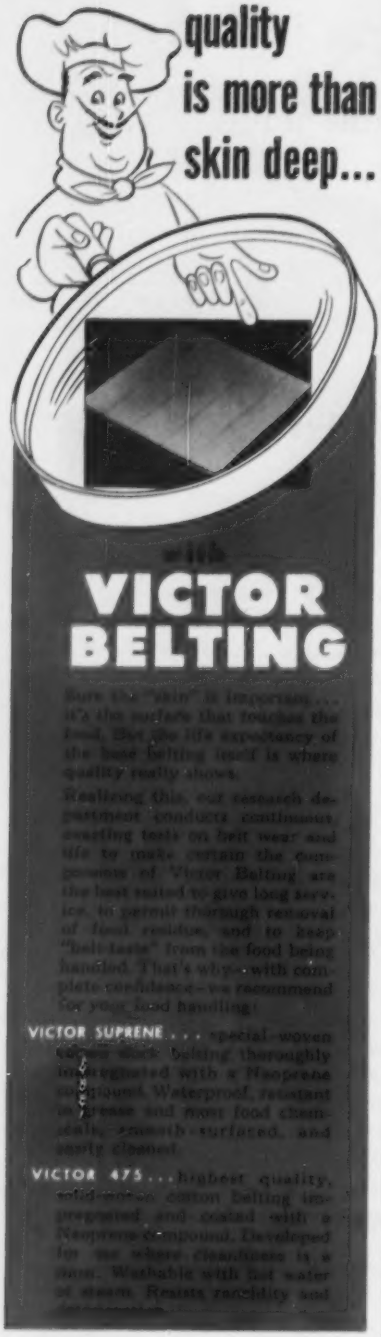
Starch Jellies — Gum Drops
Marshmallow — Fondants
Chocolate Tempering

*VOTATOR—Trade-Mark Reg. U. S. Pat. Off.

the GIRDLER Company

A DIVISION OF NATIONAL CYLINDER GAS COMPANY
LOUISVILLE 1, KENTUCKY

VOTATOR DIVISION: New York, Atlanta, Chicago, San Francisco



For food handling the modern sanitary way select from—

A COMPLETE LINE including:

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- Balata Belting
- Solid-Woven Belting
- Hycar Belting
- Canvas Stitched Belting
- Belting Specialties

Victor Balata & Textile Belting Co.

Top Beverage Flavors

—*Continued from page 55*

all of the ingredients (except sugar syrup) required to make one batch of a particular flavor syrup. In this manner, uniformity of flavor, color, etc., of bottled beverages is insured regardless of the location of the plant.

In the case of ginger ale flavor, however, the dry product is shipped directly to large company-owned plants, where it is incorporated in the sugar syrup. This is followed by filtering to remove the dry carrier before the syrup is used in a beverage.

Quality Control

The well-equipped laboratories play a very important role in operation of the Greenwich plant.

Their first function is control over the incoming products and the flavors produced from then. Latter are tested when they are made, and cannot be shipped without approval of the chief chemist.

Second function is control over quality of beverages produced in all Canada Dry bottling plants, whether company owned or franchised. This is accomplished by testing samples of water and other products used. Included is checking of bottles of beverages taken from the filling lines.

Water is tested for organic matter, total dissolved solids, total alkalinity, pH, and adaptability for use in preparation of beverages.

Finished beverages sent in from the field are first checked visually for color, turbidity, sediment, excessive pulp settlement, and absence of rings at the neck. They are then tested for gas volume, taste, and sugar content (Brix). Finally, bacteriological tests are conducted.

End (*Resume reading on page 56*)

Maraschino Processing

—*Continued from page 71*

outside coil and having the two steam inlets on opposing sides. These coils are sloped to facilitate condensate removal.

Large diameter pipes were specified so the fruit could be easily removed without becoming entangled in a series of smaller diameter coils.

Compressed air agitates the cherries, insuring proper processing of the batches. And an electrically operated, automatically controlled air valve can be set to air-mix syrup and cherries at any desired time.

The specially designed vacuum pan is equipped with a two-stage steam ejector unit. Its barometric leg extends from this third-floor location to a hot well two floors below. The pan is heated by two separate and independently operated steam jackets.

Process Briefed

Fruit arrives at this main plant in barrels. These are moved onto the pushbutton-operated elevator-dumper, then the paper cover is slit, and product is dumped into a stainless tank. Fresh water, from a 1-in. nozzle, keeps the fruit flowing to the pump and, simultaneously, begins the SO_2 brine leaching process.

It requires but 30 min. to fill a kettle. Flow of water and pump speed are regulated to keep this tank, which slopes towards the pump, from running dry and pump losing prime.

First step in processing glace or maraschino cherries is the blanching operation. It serves a twofold purpose: (1) To soften the fruit to desired tenderness, and also so that it will more readily absorb the syrup; and (2) to leach the residual sulfur dioxide content to less than 10 ppm. This is accomplished by leaching the fruit at elevated temperatures (140-200 F.), and by a series of water changes.

Before the process is continued, product is checked for tenderness, pH, and sulfur dioxide content. Variation in fruit—season to season, and from the beginning to the end of one season—makes this critical quality control necessary.

Following blanching, cherries are drained. Then light syrup and U. S. certified color are added. Next, fruit and syrup are mixed, heated, and allowed to rest as often as necessary, until reaching equilibrium (Brix of syrup in fruit equal to Brix of syrup surrounding fruit).

During "resting periods" the cherries are periodically mixed automatically by compressed air. A thermometer in each kettle enables the operator to accurately control product temperature, which is varied for the different stages of the syruping process.

After equilibrium, syrup density in the tank is increased by drawing off a predetermined amount of light syrup and replacing this with 76 Brix syrup. Amount of syrup drained is gaged by calibrations inside each tank.

This heavy syrup is added to the batch until it reaches its original level. Material is then re-heated, mixed, and again allowed to rest, with intermittent automatic mixing until equilibrium has once more been reached.

This syrup changing is repeated until desired density is attained. Glace

cherries are processed to 74 Brix and maraschino cherries to 45. The operator keeps a careful record of each operation on reference cards.

Vac Concentrates Syrup

Used syrup, drained into the holding tank, is drawn into the vac pan and concentrated to 76 Brix. By concentrating under vacuum at these relatively low temperatures, caramelization of the sugars is greatly decreased, and the finished syrup retains its light, brilliant color.

As water is evaporated, more light-density syrup is introduced from the tank to maintain a batch size of 500-600 gal. The reconcentrated syrup is pumped to a storage tank to be later reused in process syrup changes. Two level instruments are installed on the operator's platform. These provide an accurate measure of syrups in holding and supply tanks.

With processing cycle complete, cherries are discharged into a flume through a quick-opening valve. They then flow to a mesh belt conveyor.

Handle of valve is conveniently in front of the operator as he stands beside a kettle. And a mirror provides a view into the flume under the platform, so that on operating the valve he can, at the same time, observe the flow from the kettle.

Syrup drains from the fruit through the mesh-belt conveyor into a tank, as fruit moves to traying station. This flume-syrup is then pumped back into the kettle to be used as fluming medium or to wash down any remaining cherries sticking to the kettle. Later, this syrup is drained through the perforated dome to the holding tank.

Maraschino cherries are sorted on the mesh-belt conveyor and packed directly into the final container. And glace cherries are put on trays and drained overnight before being packed or used in other products.

Equipment List

Units employed in this system were fabricated by Benner Nawman, Inc., to Lyons-Magnus specifications, except for the following:

Bladeless impeller pumps—Series 5400-K, Fairbanks, Morse & Co.

Brine pump—Westco Pump Co.

Plastic tube—Carlon "EF" polyethylene, Carlon Products Co.

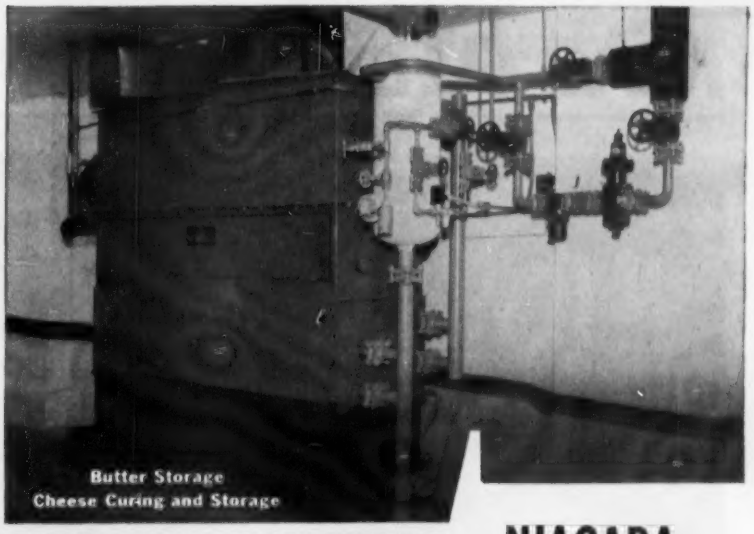
Cherry stemmer—Atlas Pacific Engineering Co.

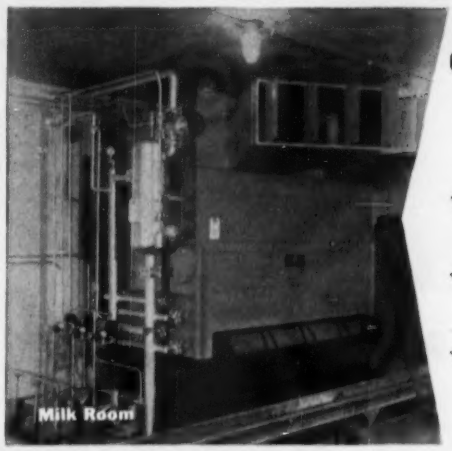
Cherry pitter—Geo. W. Ashlock Co.

Cherry candler—Food Machinery & Chemical Corp.

Level instruments—Taylor Instrument Cos.

End (*Resume reading on page 72*)


Butter Storage
Cheese Curing and Storage


Milk Room

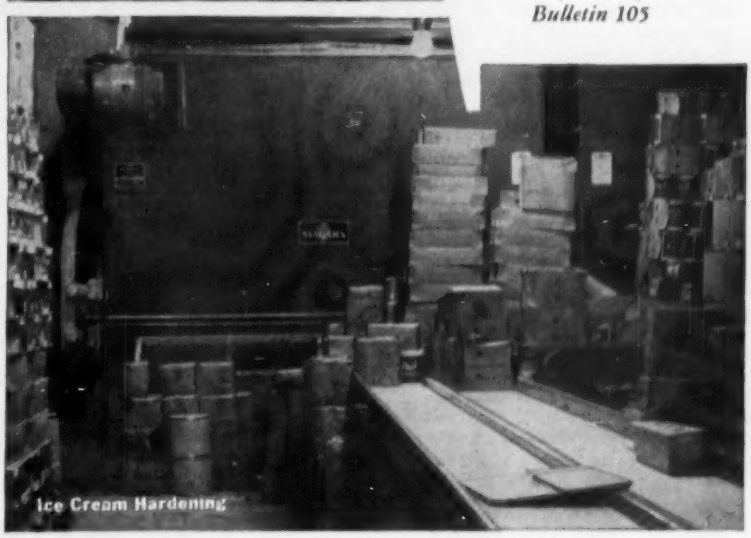
NIAGARA
"NO FROST"
25 Years' Successful Experience

★ Protect frozen food quality

★ Get faster temperature "pull-down"

★ Never any defrosting shut down

Write for Niagara Bulletin 105


Ice Cream Hardening

NIAGARA BLOWER COMPANY
Dept. F. I., 405 Lexington Ave. New York 17, N. Y.
District Engineers in Principal Cities of U. S. and Canada

NEW PACKAGES & PRODUCTS

New Ideas for Produce Packaging

Economy and produce protection are the telling features in two new packaging ideas developed and manufactured by Crown Zellerbach Corp.

A "Polar Pad" that provides uniform moisture for cut ends of lettuce is said to reduce by 80% the problem of red butts. No chemicals are used in the pad (138A).

When the lettuce is cut in the fields, it loses lactic acid at the butt. After evaporative cooling, this acid must be absorbed to prevent oxidation. At the same time, however, there must be some moisture to preserve freshness.

The pad absorbs the lactic acid but keeps the butt wet.

Savings of 50%—as much as $150 per car—are reported by packers using a new multiwall bag for shipping carrots. The bag holds 48 1-lb. or 24 2-lb. consumer packs (138B).

The heavy, 3-ply ventilated, wet-strength bag offers good product protection as well as economy. Packed with ice, the bags are said to protect shipped carrots as long as six days without deterioration.

Sealed with heavy cord, wire, stitches, or a pressure sensitive tape, the bags pack flat and take up little storage space.

Circle key numbers on Reader Service Card

Dehydrated Seafood

Three dehydrated seafood mixes are being processed by Carvel Hall Foods, Inc., Crisfield, Md. The products are instant crab flake mix, instant oyster puff mix, and instant crab imperial mix.

Ideal for canapes, hors d'oeuvres, salads, or casseroles, the seafood is packed in cans. Two cans in a colorful windowed carton provide enough food for six people.

Process involves a vacuum freeze process which is reported to remove 99% of the water while retaining natural flavor.

At present, production is on a pilot-plant scale.

Nuts Go National

Introduced to the grocery trade last month was Standard Brands new line of canned nuts. The nationally distributed products are pecans, walnuts, black walnuts, almonds (with skin and blanched), and salted mixed pecans, cashews, almonds, filberts, and/or Brazil nuts.

Using the Royal label, the nuts are packaged in vacuum-packed cup-size tins, with a key opener. The size makes it convenient for the housewife to add cup measures to her recipes without further calculation.

All nuts are fancy grade. Packaging is to take place in San Antonio, Texas.

there's no taste like home...

PROTECTED BY RIEGEL

SPRUANCE'S OLD FASHIONED BREAD MIX USES DUPLEX BAG LINED WITH A RIEGEL LAMINATED GLASSINE. WEIGHED AND FILLED ON SCOTT NET WEIGHER (U.S. AUTOMATIC BOX MACHINERY CO.)

Protecting the sales-winning qualities of fine products is only one of the many functions of Riegel papers. Saving money is important, too. Riegel does it for you by creating the right combination of the most efficient packaging materials . . . and by "tailor-making" the paper to run and seal at high speeds on your machines. Tell us what you want paper to do for you. Riegel Paper Corporation, P.O. Box 170, Grand Central Sta., New York 17, N. Y.

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specify MONEY SAVING

DARNELL

CASTERS & WHEELS

RUBBER TREADS . . . a wide choice of treads suited to all types of floors, including Darnelloprene oil, water and chemical-resistant treads, make Darnell Casters and Wheels highly adapted to rough usage.

RUST-PROOFED . . . by zinc plating, Darnell Casters give longer, care-free life wherever water, steam and corroding chemicals are freely used.

LUBRICATION . . . all swivel and wheel bearings are factory packed with a high quality grease that "stands up" under attack by heat and water. Quick grease-gun lubrication provides easy maintenance.

STRING GUARDS . . . Even though string and ravelings may wind around the hub, these string guards insure easy rolling at all times.

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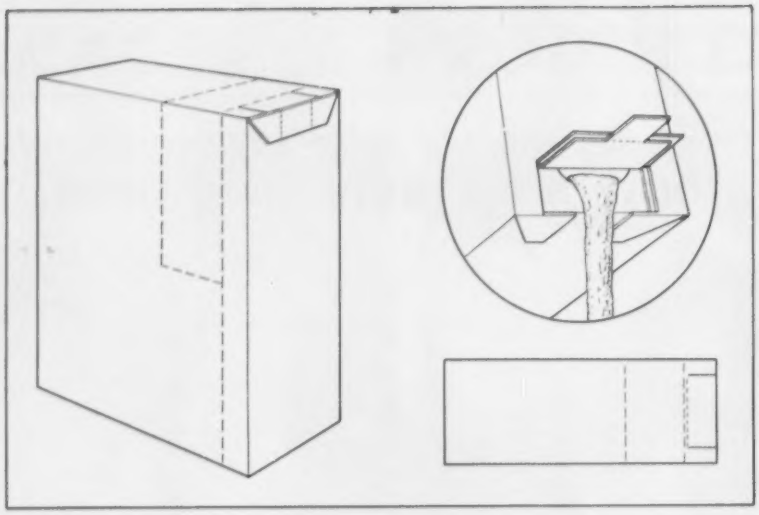


Self-Measuring Carton Developed

Recently developed by U. S. Metered Container Corp. is a compartmented cardboard carton that will pour free-flowing materials in measured amounts. In line with the trend toward more convenient packages for the consumer, the carton reduces the need for measuring cups in using sugar, salt, flour, etc.

Key to the carton's metering is a die-cut cardboard insert that automatically sets up, provides four enclosures. The compartment adjoining the pouring edge is filled whenever the carton is tilted. Now being displayed in a size that meters out a 1 cup measure, the package may be adjusted to pour larger or smaller quantities.

In addition to convenience, the insert adds strength to the carton and guards against spilling when it is knocked over or dropped. Also, there is no change in original capacity. The carton with insert is reported to cost ½ and ¼¢ more than conventional carton.

The package is said to be adaptable to standard cartoning equipment, though a specific attachment for the insert is now being perfected.

The U.S. Metered Container Corp. is realeasing the patented design to packagers and suppliers on franchise.

Circle 140A on Reader Service Card

Soft Drinks in Foil

Six different flavors of soft drink mixes have been marketed by TV Time Foods, Chicago. The nationally distributed flavors include grape, black cherry, strawberry, and raspberry (without sugar); and orange and lemon (dehydrated juices with sugar added).

Package is of Dobeckmun Co. Metalam in five colors.

Also packaged in Metalam is Kellogg Co.'s new Fizz-Ade, a carbonated soft drink in tablet form. Three tablets are packed in a strip of the material.

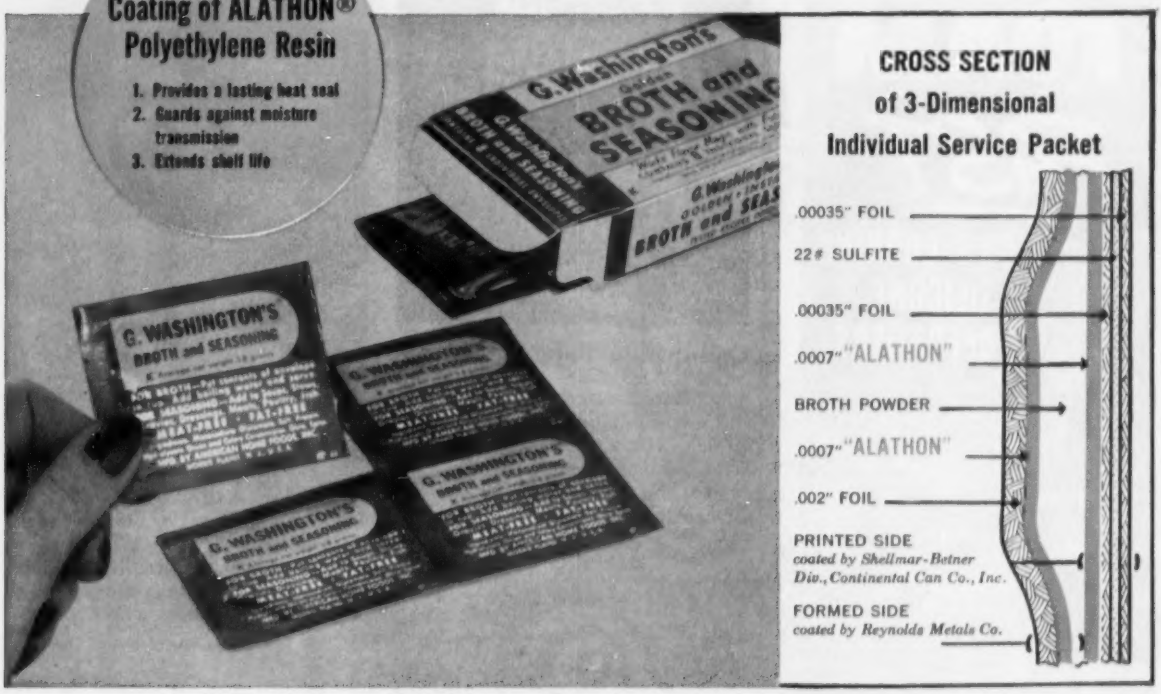
Circle 140B on Reader Service Card

Junior's Menu Boosted

Four new main dishes for toddlers have been introduced by Gerber Products Co. The new foods are junior split peas with ham, junior beef and noodles with vegtables, junior egg yolks and ham, and strained egg yolks and ham.

The mildly seasoned foods are designed as a "stepping stone meal" for children midway between baby food and standard adult fare.

See how new package prevents lumping of broth and seasoning powder



A free-flowing broth and seasoning powder has definite sales appeal . . . but keeping the powder in that easy-to-use form presented a problem to G. Washington's Division of American Home Foods, Inc. When moisture entered the package, the powder became lumpy and hard.

A brand-new packaging idea was the solution. A three-dimensional service packet was created and produced by Mason-Keller Corp., of Roseland, N. J. Now the powder stays dry and free-flowing right to the kitchen.

One of the key features of the new package is the coating of "Alathon" polyethylene resin on the inner surfaces of both the formed and printed sides of the package.

Low moisture-vapor transmission makes "Alathon" ideal for packaging this hygroscopic food powder. And its resistance to the chemical action of salt in the powder gives adequate protection to the aluminum foil. "Alathon" has a good range of flexibility at heat-sealing temperatures and excellent working properties in drawing or forming. It is odorless, non-toxic . . . keeps freshness and flavor intact.

Perhaps the many advantages of "Alathon"—specially developed as a coating resin by Du Pont—can help you solve your packaging problems. "Alathon" resists most oils, greases, acids and alkalies—stays flexible through a wide temperature range. We'll be glad to send you more information. Just clip and mail coupon below.

NEW BOOKLET

"ALATHON® Polyethylene Resin as a Coating Resin for Flexible Materials" is yours free! Just send the coupon below.

DU PONT

REG. U.S. PAT. OFF.

ALATHON®

POLYETHYLENE RESIN

BETTER THINGS FOR BETTER LIVING
. . . THROUGH CHEMISTRY

Which type of package are you interested in?

- ☐ Multi-wall bags
- ☐ Single-ply bags
- ☐ Pouch bags
- ☐ Board cartons
- ☐ Board trays
- ☐ Fiber drums
- ☐ Corrugated boxes
- ☐ Fiberboard containers

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Polychemicals Dept. 818, Du Pont Bldg.
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Please send me information on the properties and advantages of "Alathon" polyethylene resin.

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ANTIFOAM A KILLS FOAM IN 6,333 lb meat sauce

ANTIFOAM AF EMULSION KILLS FOAM IN 15,625 lb dill pickle processing solution

Here are the most economical, most versatile foam killers ever developed! Dow Corning silicone defoamers boost productive capacity; cut processing time; eliminate waste and fire hazard of boil-overs.

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FOOD PROCESSORS — Now permissible to use time and money saving silicone defoamers: Antifoam AF Emulsion at concentrations up to 34 ppm; Antifoam A at concentrations up to 10 ppm.

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NAME _____

COMPANY _____

ADDRESS _____

CITY _____ ZONE ____ STATE _____

Collapsible Tube for Syrups

Spotted at a recent packaging show was a collapsible plastic tube used to package 10 oz. of crushed strawberry syrup. Manufactured by Bradley Container Corp for Shasta Water Co., San Francisco, the tube has a screw cap.

Circle 142A on Reader Service Card

Quadruple Pie Pack

A multiple pack of four frozen fruit pies is marketed by Real Pie Bakers, Pittsburgh. The 5 oz. cherry or apple pies are in foil trays in a pjartitioned carton. A foil wrap for the carton adds sales appeal and product protection.

Extra-Gloss Overwrap

Developed to meet the frozen food packers' need for a high-gloss waxed paper overwrap that would permit faster wrapping machine speeds is Crown Zellerbach's Super Glosseal.

Manufactured by the supplier's Western-Waxide Specialty Packaging Division, the paper is strong and is reported to reduce breaking and cloggage in packaging.

The wrappers can be printed in multi-colors and are said to offer a fresher, brighter appearance than conventional papers.

Circle 142B on Reader Service Card

New Oval Honey Jars

Called Beeline, a new line of glass jars for honey and sorghum products is being manufactured by Owens-Illinois. The packages are oval in shape with a wide flat label area and "honeycomb" shaped ends. Three sizes are available: ½ lb., 1 lb. and 2 lb.

Circle 142C on Reader Service Card

Rehydrated Dehydrates

Prepared from rehydrated prunes, apricots, and peaches, a convenient 1 lb. package of frozen California mixed fruits is marketed by Mariani Frozen Foods.

Ready to serve when thawed, the fruits are prepared with sulphur dioxide, citric and ascorbic acid to retain natural color.

Each package holds the equivalent of 2 lb. of whole fruit, or enough for four servings.

Happy Mishap With Crumbs

A new Redi-Flavored bread crumb mix is processed by Brooklyn Cheese Co., New York. The mix contains a rare herb that was reportedly added by mistake in an early batch. The mix containing the wrong ingredient proved so successful on the market that the company has accepted the accidental recipe.

In addition to the unnamed herb, the mix contains grated Italian cheese, toasted bread crumbs, spices, parsley flakes, and MSG.

Package is a colorfully printed cardboard cylinder with metal ends.

New Product Shorts

Tetrahedron Carton for liquids is being promoted in U. S. by Crown Zellerbach. The Swedish-designed package is filled and formed in one operation.

Caramel and Chocolate have been added to Pillsbury's frosting mix line. Butter or margarine and water is added.

Explosion Proofing Plant

—*Continued from page 53*

ity, and not too powerful because sweeping can be overdone.

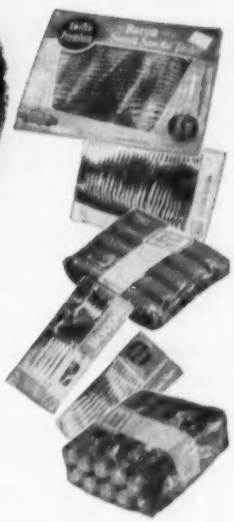
B. Curbing suspended dust—Machines that create dust must be provided with mechanical exhausters and

If it's a question of

sell

BATTLE CREEK

has the answer



Illustrated is a Battle Creek Model 43-M wrapping machine, capable of handling packages from 3" to 10" long, 2" to 5" wide and ¼" to 3" high, at speeds of 50 to 70 per minute.

For 44 years, Battle Creek machines have been helping national firms put sales appeal in the merchandising of their packages, while keeping the cost per package at a minimum. You can take advantage of this experience through the selection of one of the *Continuous Flow*® packaging machines built at Battle Creek. *Continuous Flow*® design provides gentle, careful handling of each package to keep the fresh "sell" appeal at the retail level.

LET US WRAP YOUR PRODUCT. Send us samples of your products (or if they are perishable, describe the packages and sizes) and tell us the kind of overwrapping you require. We will either wrap and return them promptly with our recommendations, or give you our best suggestions in answer to your inquiry. If you have specific questions, we would welcome a letter from you.

"Continuous Flow" Packaging

BATTLE CREEK
packaging machines, inc.
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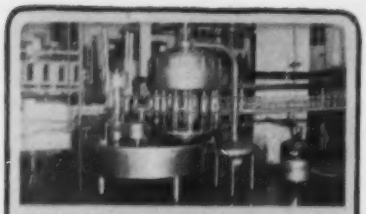

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dust collectors, which are very effective when properly designed. Removing dust clouds from working areas is somewhat more complicated, but feasible with the variety of exhausting and dust-collecting systems available.

C. Reducing explosiveness—Residual dust concentrations can be controlled by regulating room humidity, temperature, and ventilation. Also, admixtures to explosive materials have proved effective. For example, starch treated with vegetable oil does not pulverize so readily and retains moisture. Further, calcium carbonate substantially increases a starch's minimum explosive concentration and ignition figures.

Reducing the oxygen content of the atmosphere is particularly desirable in grinding and pulverizing operations. This can be achieved by introducing an inert gas, such as CO_2.

D. Eliminating ignition sources—Every potential source of static electricity must be carefully grounded and frequently examined. Proper grounding is particularly essential in machines where metal parts are insulated from each other, as in blowers, filters, sifters, mixers, and scales. Humidity control is effective in preventing accumulation of electrostatic charges on non-conductors or on poor conductors.

Belts, conveyor belts, and pulleys must be treated with special dressings, according to the properties of the material. Belt conveyors that can't be kept free of static electricity must be replaced by other handling devices.

Where possible, non-sparking electric installations and appliances should be used. Tools, shoes, and even floors are now available in non-sparking types. Further, there is that very useful protective device—the vent.

True, the vent is not an explosion-prevention unit, since it neither stops dust accumulation nor removes it. Rather, it starts operating after an explosion, to relieve the pressure of a blast, thereby reducing its destructiveness.

Also, vents help eliminate consecutive explosions. Their basic effectiveness can be assured by proper design and careful location.

Finally, management should assign a responsible person to the task of maintaining safety control.

The above article is based on a talk by the author at a recent meeting of the New York Section, American Assn. of Candy Technologists.

End *(Resume reading on page 54)*

Goes All-Out for Progress—*Continued from page 64*

Galbestos canopies cover the unloading and loading docks. And the latter has an edging of translucent plastic. Between this canopy and the 2-story office section, the wall is faced with anodized aluminum.

The three-dimensional Lay's sign on the building is made of eye-catching red and white plastic illuminated from behind. And a nice decorative touch is afforded by the practical open-work brick screen that hides a lift-truck entrance at one side of the plant.

Modern Materials

Inside the building you find an equally varied and purposeful selection of materials for floors, walls, and ceilings—accent on the modern.

Laid on concrete slabs, floors are finished with acid-proof brick in the wet processing areas. Concrete hardened with emery chips is used in the refrigerated potato and pork skin storage rooms. While in the dry process and general packaging areas, a ¼-in. Marbelette topping is placed over the concrete base to give the feel of resiliency under workers' feet—yet provide a dense, durable, and sanitary floor.

The Marbelette is colored buff and maroon in different areas to conform to the pleasant color scheme inside the plant.

In the office and cafeteria areas, ⅛-in. vinyl asbestos tile with a tan tone provides a practical, attractive flooring which does not have to be waxed to retain its luster. In the cafeteria, the floor is of ground Marbelette.

Materials in the inside walls vary with service conditions. The general design of dividing walls is light constructon above a 9-10 ft. height, and a standard thickness below that. Structural glazed tile is widely used in the lower half of walls in processing and packaging rooms for its sanitary qualities. Some partition walls are constructed of two back-to-back layers of this tile, or one layer of tile glazed on two sides. Where sanitary surfacing is not required, concrete block frequently is the wall material chosen.

Fire walls separate the process, packaging, and finished goods area. Here the material in the upper part of the walls consists of Robertson fire panels. Doors in the fire walls are either of the roll-up or sliding metal types equipped with fusible links that permit them to close automatically in case of high temperature in the rooms. Photoelectric controls hold the doors open if anyone is passing through.

Roof of the plant is supported by open-bar-truss beams, which are

painted. And on top of these, painted Sheetrock formboard is used in many areas, this being backed up by 1½-in. of insulation.

In the low-temperature pork-skin storage room, 8 in. of Foamglas insulation is installed in walls, floor, and ceiling. In the upper half of the walls, the insulation is covered with aluminum-painted Gilsonite. Ceiling insulation is suspended from tees.

Construction is similar in the potato storage rooms, except the insulation is 3 to 5 in. thick.

To make plant expansion easy, one end of the plant is closed with removable corrugated, anodized aluminum panels. Plant service lines terminate at this panel, and can be extended.

A bolted-on metal panel also covers one entire side of the boiler room, providing access of big units of equipment.

Widely used in the office areas is the Hauserman movable metal and glass partitioning. This provides easy rearrangement to accommodate new requirements and to permit office expansion. Ceilings in the office and cafeteria areas are perforated asbestos and metal acoustic tile to dampen noise. This material also is installed in the accounting department walls to reduce the noise level of office machinery.

Supplier References

Acid-Resistant Brick Flooring, Drehmann Paving & Flooring Co., Philadelphia.
Air Conditioning Units, Carrier Corp, Syracuse, N. Y.
Anodized Aluminum "P" Paneling, American Steel Band Co., Pittsburgh, Pa.
Arocior heat exchange medium, Monsanto Chemical Co., St. Louis.
Bag Making Machines, Simplex Bag Machine Co., Oakland, Calif. (Division of Food Machinery Corp.), and Roto Bag Machine Corp., New York.
Bakon Puffs Quality Grader, Sutton, Steel & Steel, Inc., Dallas, Tex.
Batch Scaling Units for Fritos Cooker, Hardy Scales Co., Maywood, Calif.
Cheese Flavor Spray Unit, Package Equipment & Development Co., Chicago.
Electronic Sorter, Electric Sorting Machine Co., Grand Rapids, Mich.
Electric Fork-Lift Trucks, Lewis-Shepard Products, Inc., Watertown, Mass.
Fritos Steam-Jacketed Kettle, Hamilton Copper & Brass Works, Cincinnati.
Galbestos Sheeting and Fire Panels, H. H. Robertson Co., Pittsburgh.
Gilsonite, Iusul-Mastic Corp. of America, Pittsburgh.
Glazed Brick and Tile for Walls, Natco Corp., Pittsburgh.
Incinerator, Joseph Goder Incinerators, Chicago.
Marbelette, Marbelette Floor Co., Atlanta.
Office Partitions, E. F. Hauserman Co., Cleveland.
Packaging Machines, Chips and Cornettes, the Woodman Co., Decatur, Ga.; Nuts, Stokes & Smith Co., Philadelphia.
Potato Peeler Feed Controls, J. D. Ferry Co., Harrisburg, Pa.
Robo-Lift Conveyor, Lynch-Robo Corp., Wallington, N. J.
Smitherm Process, Horace L. Smith, Jr., Richmond, Va.
Steam-Jacketed Pork-Skin Kettles, Hamilton Copper & Brass Works, Cincinnati.
Refrigeration Compressor (Centrifugal), Trane Co., La Crosse, Wis.
Tumblers for Cornettes, Package Equipment, & Development Co., Chicago.
Ventilating Fans, American Blower Corp., Detroit.
Vinyl Floor Tile for office area, Flint Kote Co., New York.
Waste Grinder, Chain Belt Co., Milwaukee.

End (Resume reading on page 65)

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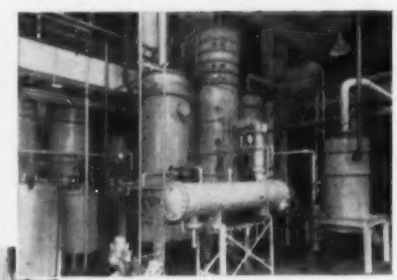

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ADVANCES IN TECHNOLOGY

Spoilage of Dairy Products By Delayed Incubation

Sterility tests on packaged foods usually use short incubation times, seldom more than a few days, and only rarely are times of as much as 3-4 weeks recommended.

But delayed incubation is possible in some types of food products, and was found in a sample of coffee-milk-sucrose product of pH 6.5 sterilized in 8-oz. bottles for 30 min. at 230 F.

When incubated at 89.6 F., spoilage occurred after 11 days. After 41 days, 40% of the samples were coagulated and ultimately (after 480 days), all had soured to pH 5.0-5.7. A strain of *Bacillus coagulans* that grew very slowly was isolated from the samples that coagulated.

An incubation of 3-4 weeks is desirable in food product sterility tests to reduce the likelihood of missing cases of spoilage due to slow or suboptimal development of normal, fast-growing organisms.—*Applied Microbiology*, 4(2), 69-70, 1956.

Cuts Losses in Transit

Inverted loading of tub baskets of fresh fruit in railroad cars reduces transit damage as much as two-thirds.

This was confirmed in tests with 17 cars of Colorado peaches in bushel baskets, and 21 cars of fresh Idaho prunes in ½-bu. baskets.

The new system, in which every other basket is placed upside down, also makes it possible to load a greater number in the same space. This reduces refrigeration cost.

Still other savings result from less basket breakage due to greater solidity of the load. This has been reduced from an average of 5-7% to less than 1%.—*Marketing Activities*, 13-15, June, 1956.

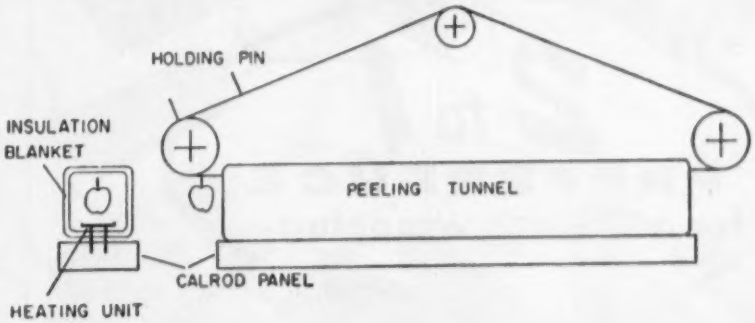
Low Temperatures Best For Peanut Storage

Spanish peanuts keep best when stored at 32-35 F. with relative humidity of 85-90%. For good germination, these conditions are satisfactory for shelled nuts in burlap bags, but unshelled peanuts germinate better when stored at room temperature (71-92 F.).

Humidity of 85-90% is higher than usually recommended for storage of peanuts, but the lots studied remained in sound marketable condition, and had good organoleptic properties after 9 months of it.

At the low temperatures, both shelled and unshelled peanuts were in excellent condition at end of 9-month period. At room temperature, however, only unshelled ones were acceptable.

As shelled peanuts occupy only about 40% of the volume of unshelled ones, the advantage of storing them in the shelled condition is obvious.—*J. Science of Food & Agri.* 354-60, May, 1956.



Peeling With Infra-Red Radiation Cuts Apple Flesh Loss 85%

Marked reductions in losses of flesh during peeling seem possible when infra-red radiation is substituted for mechanical peeling of apples.

This was demonstrated in experiments with the laboratory-size tunnel illustrated. Here, peeling losses on 5 varieties of apples averaged 2.5% as compared with 15-18% usually resulting from mechanical means.

Unit consisted of a 6-ft. long infra-red radiant panel enclosed by a ¼-in. thick insulation blanket of fibrous silica between 2 foils of Inconel. A manually operated endless belt containing steel pins was used to convey apples through the tunnel.

Temperatures of 1,220, 1,470, and 1,520F., respectively, were obtained by using 3,000, 4,000, or 5,000w. Carload units. Temperatures were measured with a potentiometer using a Chromel-Alumel thermocouple located in center of tunnel.

Varieties of apples tested were: McIntosh, Cortland, R. I. Greening, Ottawa 2016, and Spiretta. They were stored at 34F. for 1 month before peeling.

Each apple, at room temperature, was pushed onto a steel pin of the endless belt and moved through the tunnel at a slow speed. As soon as blistering was complete, it was removed and immersed in cold water to quickly cool the fruit prior to peeling it.

As tunnel temperatures increased peeling time and thickness of blanched layer decreased. Average of the two for MacIntosh apples at 1,220F. were 39 sec. and 2.3 min.; at 1,470F., 26 sec., 1.2 mm., and at 1,520F., 15 sec. and less than 1 mm.

From these results it appears that temperatures around 1,600F. would be the most desirable.—*Food Technology*, 297-98, July, 1956.

Sucrose Sweetened Berries Make Best Preserves

For production of preserves, sucrose capped frozen strawberries give a product having superior flavor to that made from berries prepared by other techniques and from other sweeteners.

This was one conclusion resulting from a study initiated to determine effect of adding various sweeteners prior to freezing on quality of berries and preserves made from them.

Whole strawberries were packed in 10 lb. friction top cans and mixed

Here's how Hamilton Foods, Inc., of Chicago, automatically overwraps their frozen shrimp.

● A recent survey, made by one of the industry's largest national publications, revealed that Frozen Food Manufacturers use Hayssen Wrapping Machines by a margin of 2 to 1 over the nearest other make, and 4 to 1 over the next two. This overwhelming preference for Hayssen explains why it has become the standard of the industry. The Hayssen is completely automatic from the feed-in of the product to the ejection of the neatly, tightly overwrapped package ready for shipment. The Hayssen will wrap any size package in paper, film or foil, directly from roll stock with heat or glue seal. Let our packaging engineers help you with your packaging problems. WRITE US TODAY for further information.

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with sugar in ratios of 4:1 and 6:1, frozen and stored at OF. for 3 and 6 month periods, then made into preserves. Used in each ratio were: 100% sucrose, 75% sucrose + 25% dextrose, and 75% sucrose + 25% Frodex. Two additional packs were prepared by capping the berries with 100% Frodex and 100% sucrose in a ratio of 9:1.

Where sweeteners were hand mixed with berries, use of Frodex resulted in significantly lower drained weights. Highest weights were obtained with sucrose. The 6:1 packs all gave higher drained weights than the 4:1.

Capping resulted in superior appearance regardless of sweetener. But the Frodex capped berries were lighter in color than those sweetened with sucrose, and this color carried through into the finished product.—*Food Technology*, 293-97, July, 1956.

Sauce Made Continuously From Unpeeled Apples

Continuous conversion of apples to sauce by an improved process featuring economy of operation, and retention of vitamins and pectin, is claimed for a patented process.

After dry inspection for removal of spoiled fruit the apples are washed and rinsed. Blossom ends are then removed by operators who also cut out any blemishes that might spoil appearance of sauce.

Then apples are coated with solution containing an oxidation inhibitor, chopped into small pieces, and dropped into a tank where stems and seeds are separated from flesh by gravity.

Slices then pass over an inspection belt and to a shredding machine which discharges into a tank containing anti-browning solution. Following a fresh-water wash and inspection shredded fruit is delivered to a continuous steam pressure apple sauce machine.

Cooked shreds are delivered to a screw conveyor where they are mixed with the desired amount of sugar, then to a finisher. Final inspection, on a transparent plate illuminated from below, for removal of objectionable particles is followed by canning. —U.S. Patent 2,744,016, May 1, 1956.

Frozen Baked Goods

Although bakery products are in many ways well adapted to preservation by freezing, the commercial outlook for the process is limited, since long storage is not a necessity as in the case of fruits and vegetables.

A wide variety of bakery products

is available daily over the entire country, as are supplies of most of the ingredients used in their manufacture. Such ingredients as eggs and fruits can be stored frozen at lower cost than in bakery products.

Frozen baked goods cannot compete in price with fresh. And finally, claims for their better quality cannot be defended. It is believed that these factors limit the use of frozen bakery products. Nevertheless consumers will buy them, and the quantity sold may amount to a substantial tonnage.

Continued experimentation in this field shows that: (1) All types of baked breads freeze well provided they are suitably wrapped and are frozen and defrosted so as to pass the freezing point rapidly; (2) yeast-raised products should be frozen after baking or in the "brown 'n' serve" form; (3) most types of pies are successfully frozen and stored, although fillings must be heated to the boiling point before pies are served; (4) baked cakes can be frozen and stored without trouble, but the process is not recommended for cakes containing a boiled-type or pudding-type filling; and (5) no problem is encountered in the freezing and frozen storage of cookies, either baked or unbaked.

Since methods other than freezing can be used to retard bread staling, their possibilities warrant continued research.—*Cereal Science Today*, 8-15, May, 1956.

Effect of Chlorine Dioxide On Flour Properties

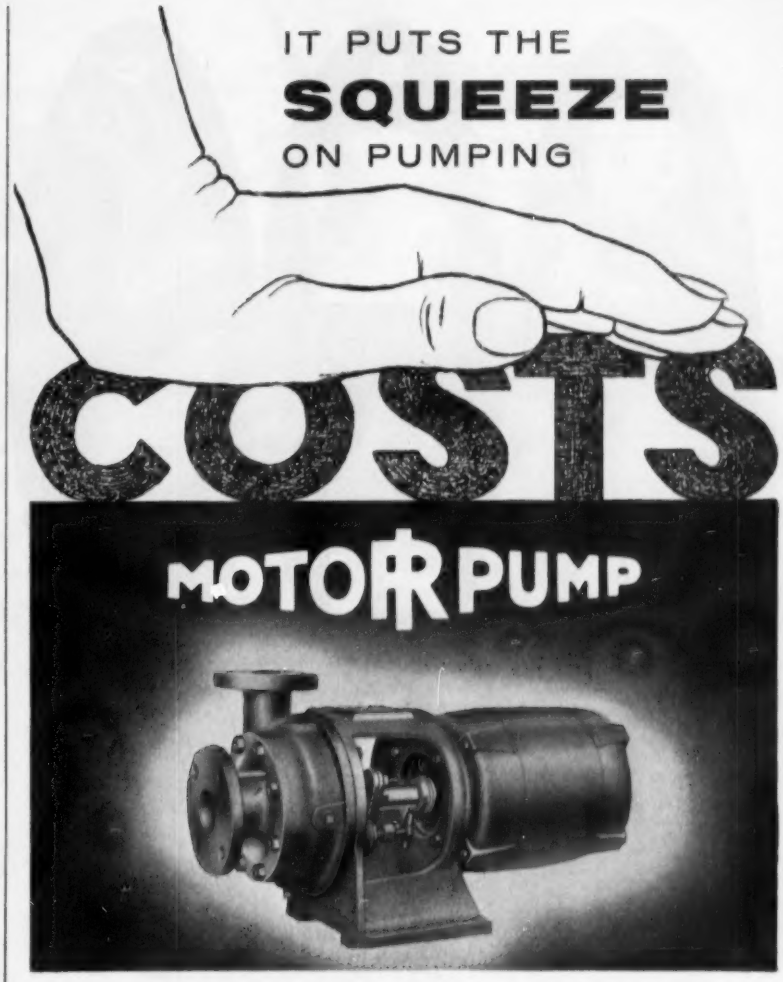
Flour oxidation, either by long storage in contact with air, physical aeration, or addition of chemical agents, is necessary for uniform and optimum baking quality.

Since general abandonment of NCl_3 because of its harmful effect on gluten due to the formation of the toxic substance, substitution of methionine sulphoxime became necessary.

Chlorine dioxide exerts the proper oxidizing action on flour, and studies of its effects at 10 times normal level for satisfactory oxidation have been made. These were compared with untreated flour, normally treated flour, and flour treated with 10 times the normal level of NCl_3.

No abnormal substances were found after the 10-fold treatment, and only tryptophan among essential amino acids suffered a reduction greater than 10% in the NCl_3 treated flour. Cystine was the only non-essential amino acid reduced in level—about 75% with the heavy treatments ClO_2 and NCl_3.

When rats were fed an unrestricted



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Installing it gives you *proof*. For one thing, you'll generally find you can use a *smaller* Motorpump to do the work assigned to pumps of larger horsepower. So costs are lower.

• Moreover, Motorpumps are so compact and efficiently designed that you save space and reduce power consumption. Installation is also simplified because they can be mounted in *any* position—on floor, wall or equipment—with no foundation needed!

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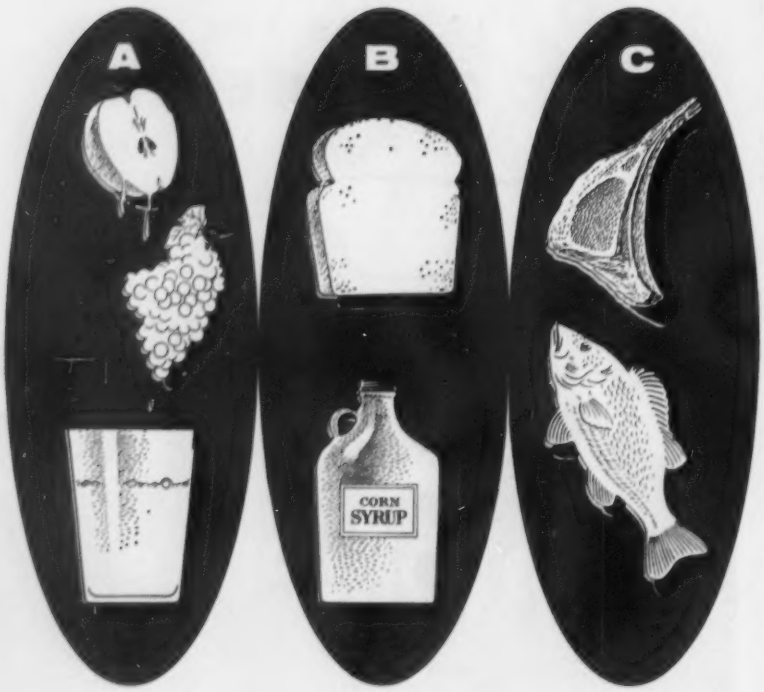

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Rohm & Haas commercial enzymes are all natural products . . . and among the most effective aids in food processing.

They are easy to use and are well suited to the mild processing conditions common to the food industry. In service they provide many benefits. For example, they clarify fruit juices, tenderize meats, aid in the production of pre-cooked breakfast cereals, improve the texture of bread, and reduce the viscosity of chocolate sirups.

Rohm & Haas enzymes catalyze specific reactions; unwanted by-products are not formed. And little enzyme goes a long way toward increased production efficiency and greater consumer sales appeal.

Write to Department SP outlining your food processing problem.

A PECTINASE: fruit juices, concentrates, wines

B DIASTASE: bread, cereal-derived products, corn sirup

C PROTEASE: meat, fish, beer

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diet containing 77% bread crumb made with the test flours, or flour proteins as the main dietary protein, there was no difference in weight gains, or demonstrable well being, whether the flour was treated or untreated, even at the 10-fold level of ClO_2.

Flour overtreated with ClO_2 had an accelerated development of rancidity in the lipid, and palatability was affected, but there was no demonstrable change in its nutritive value. Vitamin E is destroyed by all oxidizing treatments, but since flour supplies only about 10% of dietary Vitamin E, this is not significant nutritionally.—*J. Science of Food & Agr.*, 361-80, May, 1956.

Evaluating Malt Modifications

The sclerometer is an instrument for measuring and recording resistance to rupture of individual kernels of malt, thereby yielding an index of the degree of "modification" in a way that makes quantitative the ancient biting test of malters and brewers.

A wheel with 12 cam-actuated, pincer-like teeth, revolving at 2 rpm., picks up individual kernels from a sample one by one, and places them in a tiny slotted cup held in position by a loaded spring. As the wheel continues to revolve, the tooth that picked up the kernel presses it against the slot of the cup until it ruptures and the tooth can pass through the slot. Pressure required to break the kernel is registered on one of five counters.

When a sample of 200 kernels has been broken, a histogram of the breaking strengths serves to characterize the malt tested, or the average hardness of the kernels can be calculated and used as a modification index. Uniformity of malt can be estimated and mixtures can often be detected.

The instrument gives reproducible results, the precision with 200-kernel samples being about 5%. It has been used successfully as a control instrument for malting of barley, and in a brewery it makes possible an estimation of the uniformity of a malt, as well as its average modification.—*Brassirie*, 249-62, 1955, 15-18, 57-66, 1956.

UV Irradiation in Breweries

Ultra-violet irradiation of air or flat surfaces can be an effective way of sterilizing them provided the time of exposure and the intensity of the radiation are correct.

Effectiveness depends on: (1) Kind

Technical data on the revolutionary new

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(HOLLOW-FLIGHT)

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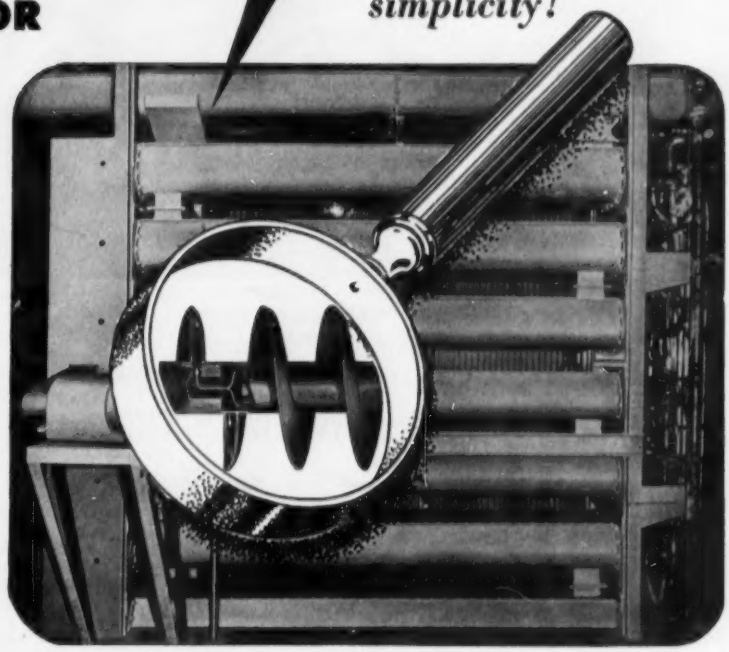
—the Continuous-Flow Heat-Exchanger that is setting new standards of *compactness! adaptability! simplicity!*

If you have processing operations where slurries, solids, pulps or pastes must be cooled or cooked, be sure to investigate the many unique advantages of the newly-developed HOLO-FLITE Processor before you install *any* heat-exchange equipment.

Here's the HOLO-FLITE principle . . .

Two or more screw conveyors rotate slowly in a trough. The blades and shaft of each flight of conveyors are hollow, with provision for circulating the heat-transfer agent through them. The product to be cooled or cooked is moved along the trough, being constantly rotated into, around, over and under the conveyor screws as it moves.

Thus, a continuous thermal transfer takes place between the product and the heat-transfer fluid circulating in the blades. The product is cooled or cooked in *continuous-flow* without the "stop-and-go" losses of batching operations . . . and cooled products can be packaged directly from the HOLO-FLITE discharge—saving space, time and additional handling.



THIS 6-TIER HOLO-FLITE cools 7 tons of cottonseed press cake per hour from 285° to 89° F. *in a total floor space of only 28 sq. ft.* *(Inset)* Enlarged cutaway view of HOLO-FLITE screw showing heat-transfer principle.

Here are typical HOLO-FLITE advantages

The HOLO-FLITE principle is so unique it is setting completely new standards of performance in *many* ways. For example . . .

*Reg. T.M.

The HOLO-FLITE Saves Space—It requires as little as 1/5th the space of other units of comparable capacity because (1) it has far greater heat-transfer area per cubic foot of space . . . and (2) the flights can be "tiered" as high as desired to give maximum capacity in very small floor areas.

The HOLO-FLITE is Versatile—Processed product can be fluid, pulp or paste—granular, crystalline or powdered solid. Heat-transfer fluid can be refrigerant, cooled or ambient water, steam, oil or any other desired fluid, at any normal temperature range.

The HOLO-FLITE is Dust-Free—Its gentle action provides large heat-transfer action without dust and with negligible particle abrasion. Simplifies installations, assures higher quality product.

The HOLO-FLITE is Adaptable—It can easily be designed to handle virtually any capacity by (a) varying the diameter of the screws (7" to 16") . . . (b) varying the length of the screws (8 ft. to 20 ft.) . . . (c) varying the number of intermeshing screws per trough (2, 4, or 6) . . . and (d) varying the number of tiers stacked on top of one another (1 to 10, or more).

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Here's the newest —and easiest —in mechanized sanitation... OAKITE "SANISEPTOR"

Oakite "SANISEPTOR" eliminates ladder, bucket and brush, dangerous climbing.

Oakite "SANISEPTOR" operates at all line pressures, any temperature. Has three nozzle tips to meet various requirements. Seamless 14-gauge steel with anti-corrosion coating. Maximum tank pressure: 125 p.s.i.

Just connect it to your hot water line!

That's all—no pump, no motor... no steam supply, tank, coils or other equipment. Put Oakite detergent in the "SANISEPTOR", connect at any point in the hot water line—and you're mechanized! Weighs only 25 lbs., throws a jet-stream of hot detergent solution, at line pressure. Twist a valve and you have instant rinsing action. Use it on vats, holding tanks, conveyors, floors, walls . . . hard-to-reach places, tight-squeeze spots . . . see how much time you save. Ask your local Oakite Technical Service Representative to demonstrate, or write to Oakite Products, Inc., 27A Rector Street, New York 6, N. Y.

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of organisms present; (2) intensity of radiation; (3) duration of radiation; (4) amount of moisture present, and (5) amount of air movement.

Most yeasts and bacteria are killed by a 1-2 min. exposure to 3,600 w./sq. cm. Molds and mold spores are more resistant. Organisms suspended in gelatin, wort, or beer are not affected. Exposure of beer bottles to UV source 5 cm. above their open mouths did not sterilize the interiors, nor did insertion of UV lamps into washed barrels for 5 min.

Pitched and wood surfaces are not suited to UV sterilization. On the other hand, a battery of UV lamps arranged to irradiate the ceiling and walls of a bottle shop 6-18 hr. a day, kept surfaces free of mold for 9 months, though sections protected from the rays, developed moldy surfaces quickly.

Effectiveness of UV can be applied to sterilize air in ducts and channels. When applied directly, lamps must be arranged to avoid irradiation of workmen, or latter should wear protective clothing and goggles.

In a brewery, UV can be used effectively in the cool-ship room, wort cooler room, starting and fermentation cellars, yeast and pure culture rooms, storage cellars, and as a protection against molds in bottle shops when installed above bottle conveyors.—*Brauwelt*, 533-36, 1956.

New Preservation Method —Radiopasteurization

High gamma radiation combined with refrigeration has been used in limited laboratory tests to increase storage life of cooked meats and blanched vegetables packaged in polyethylene bags.

Radiation dose was in the range of 100,000 rep which is less than that required for sterilization but sufficient for the destruction of 90% or more of the microorganisms without causing undesirable changes in the food. And subsequent storage at 40 F. offers protection against growth of microorganisms that might cause food poisoning. Estimated cost of the process on a commercial scale is about 1c. per lb.

Samples of smoked salmon and broiled breast of chicken packaged in heat-sealed polyethylene bags were irradiated at a dose of one megarep and stored at room temperature for several months. Flavor of the salmon was very good immediately after irradiation, and still good after storage for one month at room temperature. It developed a slightly rancid taste after

90 days' storage. Control samples developed mold after 3 days' storage.

Similar results were obtained with broiled chicken breasts. Irradiated chicken did not spoil when stored at room temperature for two months, although a slight off-flavor of irradiated meat was detected by persons familiar with these flavors. Rancidity in fat-saturated chicken skin was noted after storage for one month.

Control samples showed spoilage within a week after packaging. Storage at 40 F. would have materially delayed spoilage of both meats.—*Refrigerating Engineering*, 39-49, 98, June, 1956.

Determination of Shell In Cocoa Products

The estimation of shell in Cacao nibs, based on pectic acid content of sugar- and fat-free cocoa matter, is but one of many methods for assessing these products.

Since shell particles are easily recognized under the microscope, determinations based on microscopic examination have been favored, especially for rapid testing of numerous samples. If a defatted and desugared cocoa sample is treated with Belucci's reagent (glacial acetic and nitric acids) and heated, then washed and suspended in glycerol, the number of shell particles in a sample can be readily counted by using a magnification of 120.

Polarized light or phase contrast microscopy may be helpful in making the count. Four groups of sclerouscelled particles in 10 mg. of the glycerol suspension correspond to 1% shell in the sugar- and fat-free material.

Results with cocoa powders are quite satisfactory, but with fine, highly milled chocolates, because of the greater cominution of shell particles the figures obtained are much too high.—*International Chocolate Review* (In German and French), 138-42, April, 1956.

The Fungal Contamination Of Kentish Strawberries

Strawberries suffer mold damage most often from species of *Botrytis*, though in Kent (England) the 1955 crop was damaged chiefly by *Mucor piriformis*.

Study of individual strawberry fruits demonstrated that many small colonies of *Cladosporium*, *Penicillium*, and *Trichoderma* were present in practically every fruit. These species,

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There is no secret to Buster's freshness, unless it could be the speed with which they are moved from the field to the roaster to the can. As for keeping them fresh in the can, the makers of Buster Brand peanuts, first use standard vacuum equipment to draw all oxygen out of the package. They then apply modern gas packaging techniques to make doubly certain that taste-robbing oxygen absolutely cannot get to their products.

To be sure of highest purity gas at lowest cost they selected, after thorough investigation, a Gas Atmospheres' generator. The equipment was "entirely satisfactory" from the start. In fact, Peanut Corporation of America, makers of Buster Brand products, now specify Gas Atmospheres' equipment for use in all their modern packaging operations.

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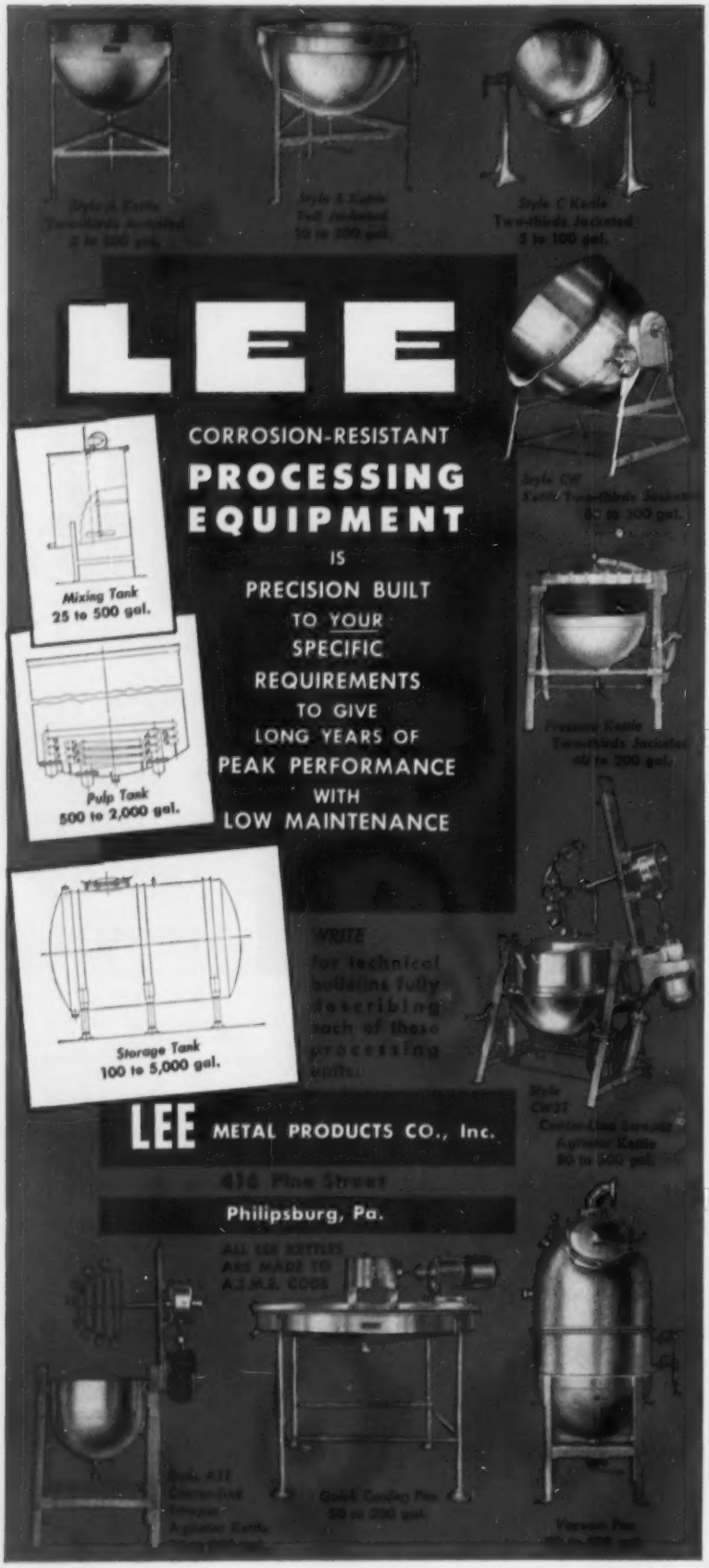


however, have an insignificant effect on the Howard mold count, while powdery mildew, *Sphaerotheca humuli*, which does not cause rot in strawberries, gives a very high count.

Thus, a mold count of 34% positive fields was obtained from fruit with just sufficient mildew to be visible to the naked eye, though 94% of the hyphal fragments in the sample were sterile. High Howard counts are, therefore, possible without visible damage to the fruit. But as long as this count is the criterion for acceptability of finished products, jams should not be made with high count fruit.

Peracetic acid (CH_3COOOH), which gives good control of mold on tomatoes, was more effective than alcohol, citric acid and hydrogen peroxide, or acetaldehyde for controlling mold on strawberries. No taint or unusual odor was detected 24 hr. after treating berries with a 0.5% solution, nor was any residual acid found on the berries 48 hr. after its application.—*Applied Microbiology*, 4(2), 84-88, 1956.

Penicillin Extends Storage Of Fish Stickwater

Development of objectionable odors and loss of solids in stickwater can be delayed as much as 24 hr. by addition of a small amount of penicillin.

When fish stickwater is treated with enzymes prior to condensing to solubles, there are periods in which it cannot be processed as rapidly as it is produced. In such cases, the stickwater decomposes very rapidly, even at 160-180 F. This is accompanied by development of foul odors and loss of a considerable percent of solids.

To test effectiveness of penicillin in inhibiting growth of bacteria responsible for the decomposition, two 7,000-gal. tanks were filled with salmon offal stickwater brought directly from the primary separators of a reduction plant at 180 F.

Stickwater was allowed to cool to 160 F., then sufficient penicillin G was added to one tank to give a concentration at 2 ppm.

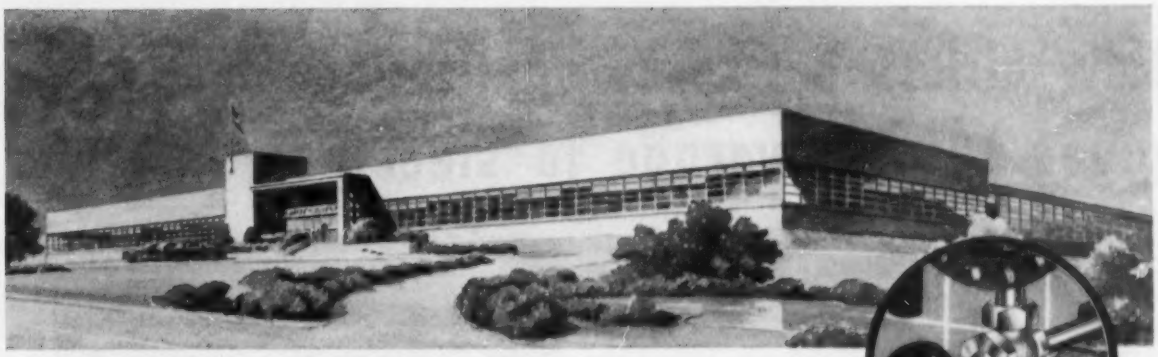
In absence of penicillin there was a 10% loss in solids in the first 24 hr., while none took place in the treated stickwater. After 48 hr., product in control tank showed a 39% loss in solids and its odor was so foul contents were discarded. The penicillin-containing stickwater showed a solids loss of 2.7% solids.

Results indicate that addition of penicillin will permit a delay of up to 36 hr. between production of stickwater and concentration.—*Progress Reports No. 105, of the Fisheries Research Board of Canada* (Vancouver), 27-30, Feb. 1956.

65-year test

directs choice of valves for new Rochester home of

WILMOT CASTLE COMPANY



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qualify on long record of reliable performance as standard equipment on Castle Sterilizers since 1890.

The Wilmot Castle plant at Rochester, N. Y., completed in 1955, was planned with the same exacting standards applied to design of Castle's fine products — sterilizers and surgical lamps for hospitals, laboratories, and the medical and dental professions.

In selecting valves for the plant, the company could depend on their long experience with the faultless performance of the valves used on Castle Sterilizers, recognizing that all Jenkins Valves — bronze, iron, steel, and corrosion resistant — are made to the same high standards.

For *both plant and product,* the time-proved *extra value* of Jenkins Valves is dependable assurance of lasting efficiency, safety, and operating economy. Jenkins Bros., 100 Park Ave., New York 17.

THE HOSPITAL LABORATORY AUTOCLAVE illustrated is one of the many types of Castle Sterilizers used in hospitals and laboratories, and shows typical use of Jenkins Valves on the steam, water supply, and drain lines. Valves are renewable composition disc type, and have special heat-resistant, non-staining Bakelite handles, with each valve's function moulded in the top. Jenkins Valves provide the sturdy construction, safety, and good appearance required. They also permit quick, easy maintenance, since the renewable discs, made also by Jenkins Bros., are available anywhere from Jenkins Distributors.

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CONTINENTAL *Landmarks*

Periodic progress reports of interest and value to the food processing field

New airless hot-spray application of enamels gives 100% coverage to steel pail interiors

Perma-Linings are applied within the formed container. Portions of the solvents burst into a gas on leaving the nozzle tip to form the spray pattern, which gives complete, uniform coverage to entire inner surface.

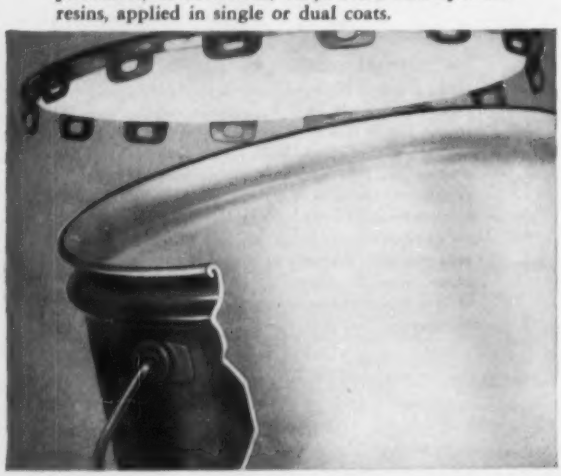
Sprayed pails are subjected to increasing heat as they move through a new, specially-designed oven. Peak bakes exceeding 470° assure complete cure of Perma-Lining.

Shippers of jams, jellies, fountain syrups, ice cream toppings and other food products will have a particular interest in a recent cooperative development of Continental research men and industrial engineers. Utilizing their vast experience with the application of can linings, our men have found a way to hot-spray enamel linings within formed steel containers for 100% coverage. Even side and bottom seams get full, even protection.

The new technique is airless—that is, no compressed air is used to atomize the enamel. Instead, hydraulic pressure is employed in connection with heat. The solvents burst into a gas when released to atmospheric pressure. By elimination of turbulence in the spray pattern, a heavier film thickness of maximum uniformity is achieved. Quick baking at steadily increasing temperatures effects a complete cure.

Continental's line of steel pails is admirably adapted to this new process. Bail ears are welded in place—not riveted—to prevent crevices at this point. Pail structure at the bottom has been altered to allow better inside enamel fillet at double-seam chime opening. Perma-Lined steel containers are made in 2- through 12-gallon sizes in open top, lug-cover style, and in 5-gallon closed-head drum style.

Linings can be developed to meet every food-protecting problem. Now in use are straight and modified phenolics, oleoresinous, vinyl resin and epoxied resins, applied in single or dual coats.



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TAILOR-MADE PACKAGE SERVICE

Questions & Answers

THIS MONTH'S PROBLEM
Controlling Liquid Level

Question—Have you any suggestions for an effective liquid-level control on a small continuous blender whose mixing action results in quite a vortex? Capacity of the blender is small in relation to the throughput, and the product is thick and practically non-conducting. Attempts to use a ball float were not successful.

JUNE PROBLEM
Part-Time Compressor

Question—We are considering making a concentrated dairy product which will have to be cooled after concentration. To do a quick and efficient cooling job, it will be necessary to use sweet and well-waters.

The difficulty is that this will be a batch process. Coming from the concentrating pan, a batch will require quite a bit of refrigeration for a short time. For the rest of the time, however, the refrigeration compressor will not be needed. We are reluctant to invest in such equipment in view of the low use factor. Could you suggest some alternate method of overcoming this drawback.

Answer—It is sometimes possible, in instances such as you have described, to use an ice-accumulator unit. In effect, you can build up refrigeration in advance of the required peak load that comes as your concentrated batch is to be cooled.

This is done by operating a relatively small refrigerating compressor more or less continuously, and by allowing coils in the water cooler to build up an accumulation of ice. Then, as the system calls for cold water gradual melting of the accumulated ice produces the required cooling of the water. And this ice water is, in turn, circulated through the heat exchanger to cool the product.

Such a system has proved satisfactory in a process very similar to yours. One advantage is reduced capital investment, compared to refrigeration equipment otherwise required to handle the complete cooling job in a short time. Another is that the smaller unit takes less space and power to operate.

There is the further possibility, depending upon your local conditions, that the ice-accumulation unit might be small enough to operate without supervision by a refrigeration engineer. The large one, on the other hand, would very likely need such attendance.

Finally, it might prove possible for you to make other uses of the chilled water during non-peak periods, as it would not be very costly to keep the unit operating for long periods of time.

More on Tapioca Cheese

In my opinion, your answer to the tapioca cheese query (FE April p. 174) was incomplete. This condition may also be caused by chlorine compounds and/or wash waters of high alkalinity.

Alkaline compounds hydrolyze proteins to form a tapioca curd similar to that caused by psychrophiles. Laboratory analysis showing no proteolytic psychrophiles, or absence of putrefaction after a reasonable storage period, should be reason to suspect chemical hydrolysis.

Common chlorine-bearing materials depend upon strong alkalies to hold the chlorine in more stable form. Occasionally, operators rely on a chlorine odor in wash waters as a rule-of-thumb test. This procedure could result in chlorine concentrations as high as 25-50 ppm., and a corresponding rise in alkalinity (or pH) to a point where chemical hydrolysis is encouraged.

Hard well water frequently has a pH over 7.0, and extended exposure of cheese to this water will cause chemical hydrolysis.

This condition can be corrected by using:

1. One of the newer neutral chlorine compounds which will not change pH of treated water.
2. An iodine-bearing sanitizing agent which is an active bactericide, but not alkaline.
3. Some acid, such as U.S.P. citric, to reduce pH of final rinse water below 7.0 or, preferably, as low as 4.8. Such acidification also retards growth of some psychrophilic bacteria.

In the event that bacteria cause tapioca curd, it is advisable to determine if some types present in the water require extended exposure to chlorine to effectively kill them. In some circumstances, it may be necessary to store chlorinated water an hour or longer to have a sterile wash water. —*M. P. Lankford, Plant Superintendent, Costello's Mendota Creamery, Mendota, Ill.*

Keeping Mustard Air-Free

Question—Our chemist believes that air in our bottled processed mustard is detrimental to quality. Do you have any pointers on reducing air content to a practical minimum?

Answer—Without full details on your processing and filling setup, we can only give general suggestions. It seems that your chemist has an analytical method for determining air in your product. If so, we suggest that he test samples from various stages of your process to spot the points where air is being incorporated. The mere locating of these places will probably call attention to operating methods that admit air, and point the way toward correction.

One possible source of air is in the aging tanks. If freshly milled mustard is splash-pumped into tanks, it will naturally pick up air. This can be minimized by directing the flow down the tank wall, or filling the tank from the bottom.

To avoid stratification, some manufacturers agitate the mustard from time to time while it is aging in the tanks. If carried out vigorously, this practice would incorporate air, thus very gentle agitation is indicated at this point, avoiding any vortex action.

Because of its viscosity, prepared mustard must often be pumped. Therefore, be sure that pump seals are tight and suction pipes are kept with submerged inlets and tight joints to avoid drawing in air. As mustard enters the filler hopper, it may again pick up air (as in aging tanks) if allowed to splash. Feeding the mustard slowly over some sort of riffle plate as

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it enters the filler hopper may aid air to escape.

Filling jars from the bottom by means of a rising table filler would be a final precaution you could take.

Bottle Breakage

Question—We have had an unusual amount of glass breakage on our syrup-bottling line this past winter. We suspect that our glass may be a trifle too cold during the coldest weather, but we have no space for warming empty glass ahead of time.

Someone suggested that we use heat lamps on the conveyor. But when we tried out an ordinary heat lamp in the laboratory, it did not seem to warm the glass appreciably. Can you suggest how we might overcome this glass breakage, considering our space limitations?

Answer—It is often necessary to preheat glass containers which are to be filled with a hot product, in order to minimize thermal shock. You probably have a high filling temperature for quality reasons, and most likely are exceeding the allowable limits of thermal shock for your containers.

First, make sure that your filling temperatures are properly controlled and are not any higher than necessary. Then, consult the manufacturer of the glass you are using, to determine its maximum thermal shock limit (number of degrees container can be below product-filling temperature without danger of breakage). This value should come from the glass maker so that it can take into consideration the shape and thickness factors of your particular design.

Also try to pinpoint minimum temperature at which glass enters your filling line. Presumably, this will be the temperature in your storage building in severe winter weather, from which glass will be delivered to your filling line as needed (because of space limitations) with little time to warm up.

Next step is to provide some sort of quick pre-heating for the containers. And for this we believe a pre-heating tunnel constructed over the bottle conveyor would suffice.

We are not entirely surprised at your failure to warm up the glass with a heat lamp. Reason is that the wave length of radiant heat from filament lamps is unsuitable for heating such materials as glass. In view of your attempt to use electric radiant heat, it appears that you would find it advantageous to do so for local reasons.

We would suggest that you consider electric radiant heaters of the hot-element type. They emit infra-red heat of a different wave length that is suitable for heating glass ("Chromalox" heaters, Edwin Wiegand Co., Pittsburgh, Pa). These are available in long narrow shape with polished metal reflectors, and can be mounted along the conveyor very close to the containers for maximum effectiveness. It is good practice to surround the heaters with a metal housing that may be insulated for better efficiency and to prevent employee burns.

We believe that a relatively small capital investment and the expenditure of a few kilowatt-hours of electrical energy will quickly solve your glass-breakage problem. Moreover, heaters will more than pay for themselves in reduced product losses and line downtime for cleaning.

Q.—What flour would you suggest for producing frozen pies?

A.—At the 31st Annual Meeting of the American Society of Bakery Engineers, Del Pratt, Omar, Inc., Omaha, recommended: "The flour should be a good grade of unbleached pastry flour. Ash content should run 0.42 to 0.44% and the protein 9.0 to 9.5%. Flour should have a pH of 5.9 to 6.0. Lower grades of flour run higher in germ components which, due to their fat content, can trigger the development of free fatty acids. This change might result in rancid or off-flavors."

Bottling Clam Juice

Question—We steam a rather large amount of clams and discard the liquid. Would it be worthwhile to pack this liquid in bottles? If so, how would we go about it?

Answer—Not knowing your production volume, it is difficult for us to determine whether it is commercially feasible for you to glass-pack clam juice.

Regardless, here's how you can proceed:

Pipe liquor from clam steamer into storage tank. Then run the juice through a mechanical filter, pasteurize 5 min. at 180F., and immediately fill into ½-pt. bottle with crown-type seal or No. 1 picnic-size cans.

The cans, for example, can be heat-processed in retorts for ½ hr. at 240 F., then immediately water-cooled.

Candy Hardens Too Soon

Question—We are a small Southern manufacturer of quality candies, sold mostly to the store trade and on roadside stands. But we have a problem. One of our competitors is making a packaged candy, known as pecan divinity, which is holding up much better than ours.

Within a couple of weeks, ours tends to become hard while our competitor's remains soft and slightly chewy. Is there some trick to his formulation or method of making the confection, commonly known by other confectioners, that might be helpful to us in extending shelf-life of our divinities?

Answer—Perhaps the so-called "trick" you refer to is your competitor's use of an humectant like sorbitol. It is available from Atlas Powder Co., Wilmington, Del., in a 70% solution (Sorbo) or in dry solid form.

What it will do in your case is check rapid moisture loss—the cause of candy hardening.

Suggested is the addition of 4-7% sorbitol solution to your candy formula. Higher percentages will further extend shelf-life of your candies.

Fire Extinguishers Safe?

Question—Our safety committee has recently raised the question of whether fire extinguishers should be considered "pressure vessels". If so, should they be given any special maintenance attention or testing to make sure that they are safe to operate? Can you give us any information on this subject?

Answer—Your safety committee has brought up a good point. For there are actually instances on record of fire extinguishers exploding during use and causing fatal accidents. Considerable pressures can build up in soda-acid extinguishers, for example, and if they have not been properly maintained these pressures can be disastrous.

It is important to thoroughly inspect extinguishers several times a year. In this inspection, you will want to take particular note of any evidences of corrosion, distortion, mechanical damage, or faulty seams. If any of these conditions are present, there is a possibility that the extinguisher may not be safe to operate at the pressures it may develop. It

---

Q.—Why should rust spots show up in our new stainless steel tanks?

A.—Only thing we can figure out is that you may be using steel wool to clean out your tanks. And if you are, some of the loose wool has probably become embedded in the stainless steel, later to show up as rust spots.

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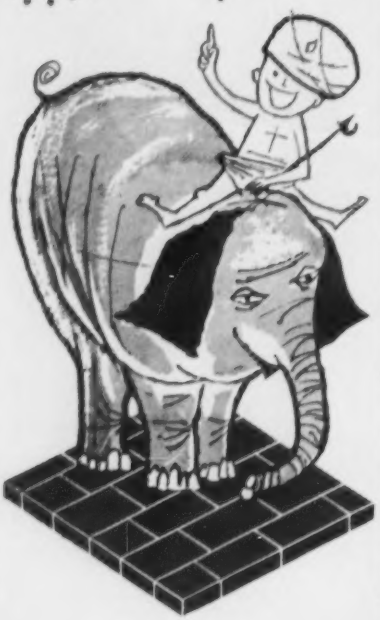

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should then be subjected to a hydrostatic pressure test before being returned to service.

Another important point that must be checked in your periodic inspections is the condition of the nozzle orifice, to make sure that it is unobstructed.

A word on the hydrostatic testing procedure. Soda-acid extinguishers of the hand type are tested at a pressure of 350 psi., which should be held for one minute. This pressure is applied at such a rate that it reaches 300 psi. in about a minute. While under pressure, the extinguisher must be carefully examined for any signs of weakness—leakage or distortion. If any are observed, extinguisher should be scrapped at once.

Possibly you have a suitable pump for hydrostatic pressure tests on jacketed kettles, safety valves, etc. If not, you might arrange with the manufacturer of your extinguishers to perform this testing. In addition to such testing, and whenever indicated by the inspection itself, it is recommended that the hydrostatic pressure test be applied about every five years as a routine precaution.

More detailed information may be obtained from the pamphlet "Safety Code for Inspecting, Recharging, and Maintaining Portable Fire Extinguishers". It is available for 50¢ from Fire Equipment Manufacturers' Assn., Inc., 1 Gateway Center, Pittsburgh 22, Pa.

Reading Wiring Diagrams

Question—Since I became plant manager a little while back, I've been able to handle production problems without difficulty. But now I'm up against something I just can't understand—reading one-line wiring diagrams to familiarize myself with our plant's electrical system.

Not only that, but I'll really be up against it when I get together with our electrician and equipment manufacturer on the installation of control systems. Is there any simple way that I can figure out these diagrams?

Answer—First, write the American Standards Assn., 70 E. 45th St., New York 17, for a copy of the just-released American Standard Y32.2, "Graphical Symbols for Electrical Diagrams" ($1.25).

After learning these symbols, first thing in reading a single-line diagram is to look for the starting point—the power source. Once located, the rest is not tough.

Electrical energy then goes through transformers that convert the power into usable plant voltages. From here, it flows to such units as lights, heaters, and motors. It also must go through distributers like fuses, bus sections, and oil- and air-circuit breakers, so it can be efficiently and safely used in proper amounts.

Low-Sodium Cheese

Question—Our company plans to manufacture a low-sodium processed cheese with a maximum of 43% water and a minimum of 48% fat on a dry basis. We have a formula for a processed pasteurized cheese, but would like to know how to make this low-sodium cheese meet U. S. and Canadian Food & Drug standards. Can you assist us?

Answer—We do not see how you can make a low-sodium process cheese without actually producing the cheddar that goes into it. The sodium added during processing is relatively small compared with that present in the cheddar. However, if you are making the cheddar, you can treat the raw milk (probably by ion exchange) to remove most of the sodium.

Then you should eliminate the salt, or try a salt substitute that does not contain sodium. If you are using emulsifiers such as sodium citrate, monosodium, disodium, or trisodium phosphates, you will have to switch to potassium or calcium salts.

This procedure will give you a truly "low-sodium" process cheese.

With reference to the standards, we have checked with the local office of the Food & Drug Administration and find that none have been set. Therefore, standards for process cheese (which we think are not more than 41% water, nor less than 49% fat in the solids) will apply.

Q.—Can you advise me on how to make cheese sticks?

A.—Blend in a horizontal beater-type mixer with sufficient milk to make a stiff batter: Grated cheese, 32 lb.; flour, 25 lb.; eggs, 10 lb.; salt, 6¼ oz.; baking powder, 12½ oz.; ground pepper (white), 1½ oz.; and paprika, 1½ oz. Run batter through sheeter to form ¼-in. thick sheets. Cut into strips, roll into sticks, and fry at 375 F.

Frozen Chicken Fricasse

Question—You've already supplied us with formulas for some frozen ready-to-heat-and-eat dinners. Now can you assist us again with instructions on preparing the highest quality pre-cooked chicken fricasse to be

packed for freezing in crimp-sealed aluminum foil pans?

Answer—Pack pieces of light and dark cooked chicken meat (preferably slices, where possible) into foil pans. Select only breast, thigh, and leg meats for each can. Include, too, hearts and gizzards.

Complete fill in each foil pan with a gravy comprising: Chicken broth, 15 lb.; fresh milk, 5.75 lb.; salt, 1 lb.; white pepper, 2 oz.; and a smooth flour paste (¾ lb. of flour with cold water).

Sprinkle paprika over top of product in each filled pan, crimp-seal foil lid to pan, and freeze.

Coffee-Type Hard Candy

Question—We are anxious to obtain a formula for a high-quality hard candy, preferably one made with pure coffee and suitable for wrapping. And can you furnish us processing data?

Answer—Gradually bring to a boil in a gas-fired copper pan: Granulated sugar, 74.63%; water, 17.91%; and invert sugar, 7.46%.

Wash down sugar crystals adhering to pan while bringing to boil. Cover boiling syrup for 3-4 min., remove cover, and rapidly heat to 320 F.

Pour batch onto oiled cooling slab. After 3 min., turn in cool edges. When partly cooled, fold batch, add enough pure dry soluble coffee (about 4%) to suit your taste, and then work it into the hot portion of the batch. Finally form, cut, cool, and wrap.

Making Pickle Relish

Question—We'd like to make a quality pickle relish. Would you have a formula and detailed processing instructions?

Answer—Here's a formula: Bloaters (sweetened, spiced chopped pickles), 67.50 lb.; sweetened, spiced, chopped cauliflower, 28.50 lb.; sweetened, spiced, chopped onions, 3.75 lb.; chopped peppers, 3.75 lb.; celery seed, 0.75 lb.; tumeric, 1.50 oz.; and brine, 58.0 lb.

Brine should have a specific gravity of 1,160. Acidity should be 3.50% by weight (expressed as acetic acid), and soluble solids should be about 35.8%.

Now to manufacturing. Individually chop stock in pickle chopper to following sizes: Pickles, 5 mm.; cauliflower, 9 mm.; and onions, 10 mm.

Weigh chopped pickle stock into suitable containers, add tumeric, and thoroughly blend. Add peppers, celery seed, and again blend. Fill into jars, cap, and label.

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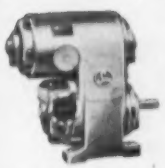

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Useful New Books & Government Publications

Revised Canner Guide

1956 CANNERS DIRECTORY. *Published by National Canners Assn., 1133 20th St., N.W., Washington 6, D. C. 1956. 240 pages. 6 x 9 in., cloth. Price: $2.50 ($1 to members).*

Over 2,200 canning firms are listed by state in this annual revision of a useful reference work. Locations of the plants of each company are listed, along with data on specific products manufactured.

The directory also serves as a guide to National Canners Assn., the National Food Brokers Assn. and Canning Machinery and Supplies Assn. An over-all commodity index covers 611 different canned items.

Consumer Spending Study

Publication of a series of volumes dealing with statistics and research in consumer spending has been announced by the University of Pennsylvania's Wharton School.

There are two sets of books. The first covers expenditures and related data for 1950 and 1951 compiled by the Bureau of Labor Statistics. The first three volumes of the first set are of particular interest to the food industry.

These cover a summary of family accounts (Volume I), a summary of family expenditures for current consumption (II), and food, beverages, and tobacco spending (III).

The second series deals with research studies of economic and social aspects of consumption and saving patterns by members of the Wharton School. In this series, Volume XII covers food, beverages, and tobacco.

Successful Supervising

INFLUENCING EMPLOYEE BEHAVIOR *by Richard P. Calhoun and C. A. Kirkpatrick. Published by McGraw-Hill Book Co., 330 W. 42nd St., New York City 36. 1956. 312 pages. 5½x8¼ in., cloth. Price: $4.*

The importance of good management-employee behavior is indisputable. This book sets forth in clear and practical language, the methods by which a supervisor can earn the willing cooperation of his men.

The supervisor is presented with the best ways and means to offer suggestions, instructions, and criticisms to employees—individually or in groups. Among subjects discussed are pre-approach work, removing employee resistance and opposition, interviewing, and effective presentations.

The book brings the reader up-to-date on developments in motivation and group dynamics, helping him deal more effectively with his personnel.

This book is a "must" for food plant supervisors and management.

Fats & Oils Guide

CATALYSIS, VOL. III *Edited by Paul H. Emmett. Published by Reinhold Publishing Corp., 430 Park Ave., New York City 22, 1955. 504 pages. 6 x 9¼ in., cloth. Price: $12.*

Dealing with hydrogenation and dehydrogenation, this third volume of a series provides research chemists with a sound guide. Among subjects covered are hydrogen-deuterium exchange, synthesis of a ammonia and methanol, dehydrogenation of butane and butene to form butadiene, and hydrogenation of fats and oils.

An author and subject index is included in the illustrated work.

1956 Potato Reference

AMERICAN POTATO YEARBOOK 1956. *Published by American Potato Yearbook, 8 Elm St., Westfield, N. J. 1956. 80 pages, paper. Price: $2.50.*

Special feature of this 1956 issue is an article on inhibition of potato sprouts by irradiation. Also included is a list of references on potato culture in the U. S. and Canada and a guide to U. S. standards.

An Onion Supplement offers articles on onions, a listing of research workers, and information on onion production.

Booklets & Reports

RAISING PROFESSIONAL STANDARDS AND IMPROVING EMPLOYMENT CONDITIONS FOR ENGINEERS. *Published by Engineers Joint Council, New York City 18. 14 pages, paper. No charge. Recommendations of EJC.*

LARD AS A SHELF ITEM. *Published by American Meat Institute Foundation, Chicago 37. 19 pages, paper. No charge.* Processing steps necessary for quality protection.

FE REPRINTS AVAILABLE

Listed below are special sections, flowsheet book, and articles from past issues of FOOD ENGINEERING which are available in reprint form. Single-copy prices are listed. For orders of 20 or more, there is a 25% discount. To order reprints, use coupon at bottom of page. You will be billed when your order is filled.

1. Meat Special $1.25
Contains a series of 9 articles: (1) Cold Sterilization Problems. (2) New Continuous Lard Process. (3) Progress in Meat Dehydration. (4) High-Speed Chub Packaging. (5) Atomic Irradiator Designed. (6) Improvements in Unit Tasks. (7) New Processes for Old Products. (8) Map Unravels Delivery Snags. (9) Saves 50% of Retort Steam.

2. Dairy Special.....$1.25
Ten timely articles are included: (1) Dairymen Face Challenging Changes. (2) New Processes for Instant Dry Milk. (3) Controls Presage Automatic Dairy. (4) Save With Cleaned-in-Place Pipes. (5) Hi-Oxidation Solves Waste Problem. (6) Cheese Keeps in Antimycotic Wrap. (7) Plastic Tank for Milk Trailers. (8) Bulk Handling Aids Processors, Too. (9) Advanced Dry Milk Flowsheet. (10) "Tracers" Detect Foreign Fats.

3. Ingredient Special $1.25
Ten articles helpful in improving product formulation: (1) Chemicals Still a Question. (2) Role of Antioxidants. (3) MSG —Unique Enhancer. (4) Tailored Salts Add Values. (5) Ascorbic Acid Betters Meats. (6) Dry Solubles Are Versatile. (7) Sugar Types and Uses. (8) Latest on Low Calories. (9) True-Fruit Hows and Whys. (10) Stepping Up Nutrition.

4. Packaging Special $1.25
Six articles of practical value: (1) Flexibles Are Revamping Packaging Pattern. (2) How to Avoid Damage in Shipping. (3) Bundling Frozen Foods. (4) One-Portion Packets. (5) Automatic Packaging Line. (6) Paper Vs. Glass.

5. Canning Special $1.25
Eight articles on significant developments: (1) High Frequency Looms as Improved Cooking Method. (2) New Twist in High-Short Retorting. (3) Full-Flavor Concentrates by New Recovery Techniques. (4) From Orchard to Cannery—Under Water. (5) At Gerber's, Quality Control Reigns Supreme. (6) Bulk Brining Spells Big Benefits to Canner. (7) Top-Notch Tomato Processing Operation. (8) Dual Tomato Cannery—How It Ticks.

6. Book of Flowsheets.....$2.00
Few copies of 1949 edition still available. It contains 130 process charts covering a wide variety of food manufacturing operations. Charts are accompanied by brief descriptions of the processes.

7. Preventive Maintenance $0.50
An 8-pager packed with information that will help to minimize costs, reduce down-time, and promote quality through more effective maintenance.

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MERCK INGREDIENTS IMPROVE FOOD PRODUCTS

Here's a golden opportunity for some manufacturer. Peanut butter is a natural for vitamin A fortification. This popular spread lacks vitamin A, but recent tests show that the vitamin can be easily incorporated—with existing equipment.

People rely on fruit and vegetable juices for their vitamin C. Unfortunately, the natural products are highly variable in C content. You can make definite label claims for your juices by standardizing vitamin C content with Merck Ascorbic Acid.

Nutrition-minded Americans rely on modern macaroni products for substantial amounts of food energy. More recently, manufacturers are noting increased consumer acceptance for macaroni enriched with Merck Vitamin Products. Enrichment packs a potent point-of-sale appeal.

With millions of people watching their calories, Merck Calcium Cyclamate—a non-caloric sweetening agent—is a valuable ingredient in a variety of dietetic foods and beverages. It is stable in baking, boiling, and freezing processes, and is compatible with all of the usual flavors.

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KEEPING UP WITH THE FIELD

Technical News • Washington Highlights • Economic Trends • Labor Developments

Tubed Foods Score U. S. Hit

Imported Swiss jams and chocolate icings in metal tubes were enthusiastically received by American shoppers in a recent trial sale conducted by giant Gimbel's department store, New York City. Store officials say sales exceeded all expectations. The tubed products, which are common in Europe, have gained little ground in the U. S. But rising imports have now stirred up interest in the packaging method among U. S. manufacturers.

Army Solicits Industry For Atomic Plant Ideas

Proposals on design of a $3,000,000 pilot-sized food irradiation plant are being solicited from the processing industry by the Army Chief of Engineers.

When completed in late 1958, the radiation center (FE Feb., p. 189) will be the first atomic plant in the world devoted to maximum utilization of gamma radiation, which has been regarded heretofore as an undesirable by-product of reactor operation.

The atomic reactor will be built on designs formulated by AEC. A linear accelerator and the food processing section will be designed by the Army Quartermaster Corps.

The new facility will boost QMC's already-extensive research program in the use of atomic radiation for processing food products.

Newest Food Packaging Plastics Revealed by SPI Experts

Bewildering new developments in flexible and rigid plastic packaging materials—of high interest to modern food packers—were unveiled and clarified by speakers at the recent annual conference of Society of the Plastics Industry, Inc. (SPI), in New York City.

Here are capsule highlights:

Oriented Mylar that shrinks when exposed to heat—a further improvement on an only-just-arrived film, was described by T. R. Baxter, general research and development manager of Continental Can Co.'s flexible packaging division.

Also, two new non-toxic stabilizers for polyvinyl chloride film, he continued, have now been approved by FDA. These prevent discoloration of this film at high process temperatures, thus opening the door for wide food applications (Ferro Chemical Co.).

Further, a new film has been announced by Minnesota Mining & Manufacturing Co. It has the strength and oil resistance of polyester films, and is heat-sealable—with resultant bonds claimed to be stronger than the film itself. Too, the film strongly resists boiling and punctures.

Poly propylene, latest Italian development, may soon compete with polyethylene. This new plastic is claimed to have great heat resistance, high tensile strength and resistance to organic solvents, and totally lacks the "waxy" feel.

Specifically designed for better squeeze bottles, is a new DuPont resin. Its higher crystallinity gives increased clarity, stiffness, and surface sparkle, and reduces permeability.

In contrast to heat-shrink films, polyethylene is now oriented during extrusion so that it will stretch like a rubber band. Thus, products can be packaged tightly in this film, eliminating voids and excess air, without resorting to heat treatment.

Likewise, this standard film has also been recently modified by irradiation —which gives striking improvements in its resistance to solvents and stress-cracking, even at elevated temperatures.

"The future for rigid plastic packages is to be found in the garbage wagon," declared L. Stouffer, Editor, *Modern Packaging* magazine. He used this startling statement to point up the fact that if rigid containers are to reach consumption rates in the billions, it must be on a throw-away basis. They must not be considered by the housewife as a reuse unit.

On the optimistic side, Editor Stouffer pointed to the phenominal rise of polystyrene containers for ice cream on the West Coast, where sales increased as high as 800% after their introduction. Also noted was the popularity of recently-introduced plastic tomato and berry trays.

E. B. Stratton, Jr., Auto-Vac Co., detailed development of revolutionary molded egg cartons and hard candy packages.

Both speakers stressed the point that in all these cases housewives were willing to pay a premium price for product visibility. But, they declared, this unwelcome premium is also reduced drastically when the containers reach large volume distribution.

Electronics Aid Packer

Humdrum accounting procedures are stepped up to new heights of speed and efficiency at Sugardale Provision Co., Canton, Ohio. For, this meat packer has recently adopted an electronic, punch-card computer (Remington Rand's Univac) to aid calculation of payrolls, salesmen's commissions, and accounts receivable and payable. The lightning-fast computer will also quicken sales and cost analysis, inventory control, and enable automatic billing.

New Federal Tax Relief For Food Research Spending

Food companies doing their own research will be allowed more liberal income tax deductions under a new regulation recently circulated by the Internal Revenue Service (IRS) for industry comment.

Proposal sets forth the rules and procedures that the government will apply to firms taking the new deduction. And as such, the ruling brings the relief for experimental spending that congress granted in the 1954 revision of the Internal Revenue Code.

Until this new law, deductions tended to favor large companies, with heavy year-in-year-out expenditures for research and development, who had the legal talent to press their case before IRS. Now small and less-well-staffed companies will get the same break. And all firms can apply the liberalized rules to research costs incurred during a taxable year beginning after Dec. 31, 1953, or ending after Aug. 16, 1954.

The IRS regulation fills a big gap left by the Congressional law-makers —a complete definition of what is and what is not a research deduction. Briefly, here's how IRS pinpoints it:

Expenditures must represent research and development work in the experimental or laboratory sense, and must not be deductible under other internal revenue provisions (e.g., as the depletion allowed extraction industries—*The Editors*).

Included are "generally all such costs incident to development of an experimental or pilot model, plant process, product, formula, invention, or similar property, and improvement of already existing property of the type mentioned." When such work is farmed out to other companies, it can be deducted too, providing the "others" are individuals, research institutes, foundations, or similar contractors—not rival manufacturers.

Firm may also deduct depreciation or depletion on land bought for use in a research project. But it cannot deduct money spent to acquire or improve the property.

Also excluded, are sums spent for "ordinary business expenses," such as quality control, testing, and inspection. Marketing and management surveys, advertising, and other promotional expenditures are also out.

IRS closed proposals on the new regulation July 20, but is expected to hold public hearings sometime before issuing final rules.

First Industrial Reactor To Probe Rayed Foods

On June 28, switches were closed, and the nation's first privately-owned nuclear reactor for industrial research went "critical". The unit, financed by 24 leading U. S. industrial companies, will be manned and operated by Armour Research Foundation of Illinois Institute of Technology, Chicago.

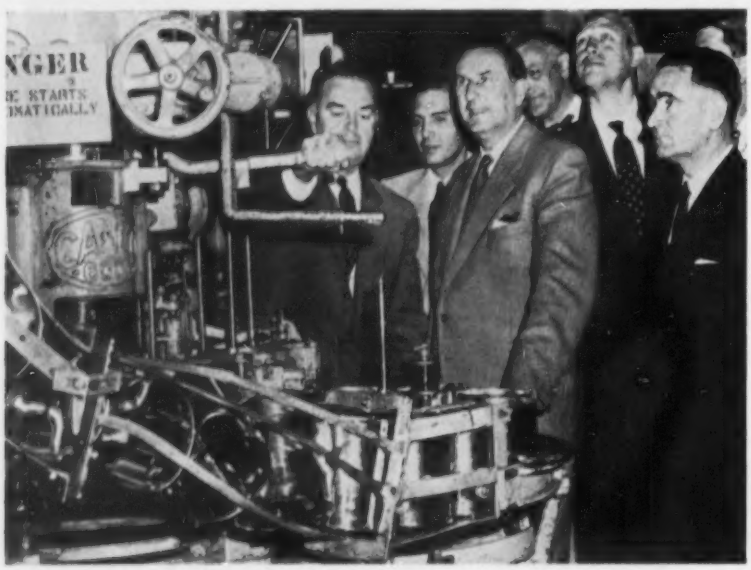
One of the chief benefits to be derived from the new installation is increased research into use of atomic energy for packaging and sterilizing foods. The $700,000 unit is a gamma and neutron source. And it is housed in a new $1,250,000 physical and electrical engineering research building, just being completed by ARF.

Single-Sample Taste Test

To spot insecticide residues in processed foods, a new single-taste testing technique has been developed by USDA's WURB, Albany, Calif.

Declaring that the triangle tests formerly used were totally inadequate, the researchers have evolved a single-sample method, with the separate tests spaced up to three hours apart.

Such a system, say the scientists, is much more positive for detecting off-flavors distinguished by a lingering after-taste, or those that quickly fatigue taste buds, than direct comparison methods.



Foreign Visitors Eye U. S. Know-How

On their current good-will tour of U. S. industry, government officials from ten NATO countries observe high-speed can-making equipment at the American Can Co. plant in San Francisco. Here, plant manager J. R. Carr (left) explains operations to representatives from Portugal, Germany, Norway, Belgium, and France.

ACS Plans Food Display

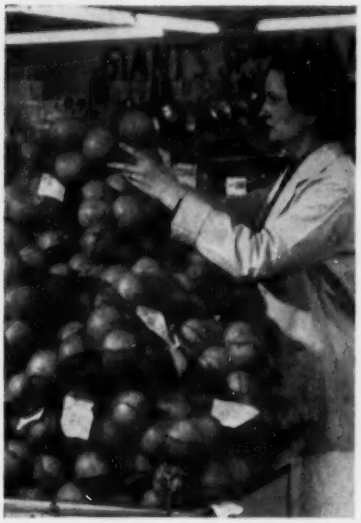
Food manufacturers are being urged to help set up a display of new food products containing chemical additives at the American Chemical Society (ACS) meeting in Atlantic City, Sept. 16-21.

ACS invites all interested processors to send one sample of their new items to R. M. Warren, Convention Hall, Atlantic City, N. J. Samples should be sent not later than Sept. 12.

Aerial Spray for Medfly

With three new counties added to those already under quarantine, Federal and Florida State officials are resorting to aerial spray techniques to control the spreading Medfly menace that threatens Southern citrus fruit and vegetables (FE July, p. 190).

Multi-engine aircraft have already distributed a fine mist of insecticide over some 210,000 acres on Florida's southeastern coast. Dr. Byron T. Shaw, Administrator of USDA's Agricultural Research Service, says the program will be repeated until immature insect forms, now in fruits and soil, are destroyed.



Fungicide Cuts Fruit Loss

Storage and sales life of pre-bagged Florida citrus has been boosted an extra two weeks through discovery of a new fungicide (Dow Chemical Co.) that cuts fruit decay from a previous 12.6% to a low of 0.3%. The compound is applied at the packing house in a 2% water dip. Fruit are immersed for 2 min. in the 90F. bath.

Hors d'Oeuvres

▶ What do people without children eat for breakfast in the city of Chicago? According to the "Tribune," 41.9% of them buy ready-to-eat cereals merchandised to youngsters. Didn't someone say that adults are just full-grown children?

▶ **The 41.9% figure is for adults without children under 15. So don't get the idea that Chicagoans aren't tending the home fires.**

▶ Sugar will renew a person's energy between meals and help to avoid overeating at mealtime. So sweets to the sweet to keep them looking sweet.

▶ **Know where's the largest stockyards in the world? Sorry, Chicago, 'tis in Omaha.**

▶ Low-calorie ice milk—or creamless ice cream—is selling well in several areas. Consumers' shapes are reshaping the food business.

▶ **New ideas are cooking in the Air Force for in-flight feeding at high altitudes. One is tablet foods in a handy dispenser. Another is semi-solid foods in squeeze tubes. —Just the things for busy high-altitude executives.**

▶ A new way to progress is the brainstorming session. No practical considerations are allowed to dampen the brain waves. This puts mind over money matters —for the moment, that is.

*Trona is the trade mark of American Potash and Chemical Corporation.

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Austrians Pipe Milk From Alps to Dairy

Problem of transporting milk from Alpine meadows to valley processing plants has been solved by one Austrian dairy with a 7,217-ft. plastic pipe line.

The unique materials-handling method was designed by two technicians at the Mittersill Dairy, Tyrol Province. It consists of 0.624-in.-dia. polyvinyl chloride piping that carries over 5 gal. per min. Head on the steeply-pitched line is 1,541 ft. High mechanical strength and great flexibility permit pipe to follow the terrain.

Milk is pumped through only in the early morning. Water is run through the rest of the day to insure cleanliness.

Food Sales Hit New Peak

Roundup of sales figures for food and grocery products shows a new peak in the first six months of '56, says Paul S. Willis, President, Grocery Mfrs. of America.

Retail sales hit $22 billion during this period—5% over the same months in '55. Since seasonal factors generally produce higher sales in the latter half of the year, total figure may well surpass $45 billion, compared with $43.7 billion in '55.

Continental Merges Again

With the Hazel-Atlas merger barely under its belt (FE July, p. 189), Continental Can Co. has taken another jump in size by absorbing Cochran Foil Co. The latter is a noted producer of rigid aluminum foil containers, used extensively by frozen food and baked goods processors.

Continental, far-and-away the largest container company in the country, is now expected to reach annual sales of nearly $800,000,000.

Vote Against Milk Bottle, Want Cheap Bulk Unit

Housewives consider standard milk bottles and cartons a nuisance, and would prefer a bulk dispenser, according to an agricultural and economic survey made in Moscow, Ida. for Norris Dispenser Co., Inc., Minneapolis.

But while the ladies thought their families would drink more milk from these units, researchers report some important "ifs" that temper the picture.

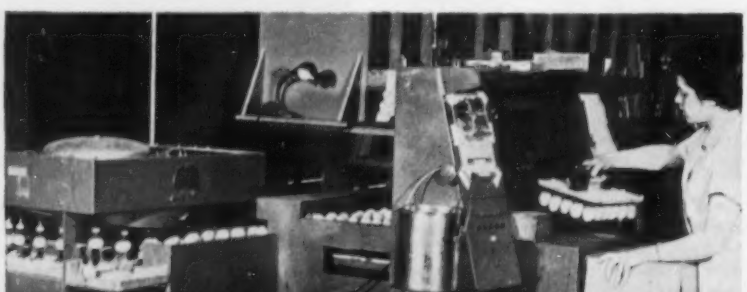
For one thing, not all homeowners want the dispenser if they have to pay for it. And others (64%) only want it if they can make enough on the cheaper milk to pay it off in 1-2 years. This would necessitate savings of 2-6¢ per quart.

Furthermore, to accommodate a standard bulk unit, holding two, 5-gal. cans, most modern kitchens would have to be remodeled.

Flavor Men Pick Officers

Don C. Jenks, Foote & Jenks Co., Jackson, Mich. has become '56 president of the Flavoring Extract Mfrs. Assn. of the U.S.

Other officers: M. J. Hess, S. Twitchell Co., Camden, N. J., 1st



Sorts Eggs at 14,000/Hr.

This newly-opened plant of Connecticut Poultry Producers, Inc., Hamden, includes latest egg-grading equipment (left). The rotary unit (American Machine & Foundry) operates by means of vacuum lifters, that pick up, weigh, and separate eggs at the rate of 14,000 per hr.

v.-p.; E. N. Heinz, Jr., Food Materials Corp., Chicago, 2nd v.-p.; C. P. McCormick, Jr., McCormick & Co., Inc., Baltimore, 3rd v.-p.; W. G. Grant, National NuGrape Co., Atlanta, secretary; L. E. Smith, Virginia Dare Extract Co., Brooklyn, treasurer.

Wine-By-Sea Shipment Gains New Impetus

A second California company now plans West-to-East shipment of bulk wine by sea. The latest word follows close on the heels of California Transcontinental Wine Co.'s announcement (FE May, p. 197).

United Vintners, Inc., owner of the Petri wineries, has placed an order for a $6,000,000 tank ship. And it plans to start operations by May '57.

Total capacity of vessel will be 2,500,000 gal., and load can be boosted another 600,000 gal. by installation of deck tanks.

Bottling facilities in the East will be relocated so wine can be pumped direct from ship to dockside plants. Loading depot (capacity 3,000,000 gal.) will be built in Stockton, Calif.

Company is now negotiating with eastern firms interested in using tanker for westbound shipment of liquid products.

Briefly . . .

● TRUCK FLEET managers can learn new ways to cut automotive costs in a 4-day course to be given by Fleet Managers School & Seminar in N.Y.C., Sept. 17.

● **NONFAT DRY MILK is now the legal name for this dehydrated dairy product, as a result of a law signed by President Eisenhower last month. The word "solids" was dropped from the title because it confused consumers.**

● FELLOWSHIP AWARD, sponsored by Gerber Products Co., Oakland, Calif., has been won by Dr. James C. MacDonald, McMaster U., Hamilton, Ont. for his "Studies into Action of the Vitamin Biotin."

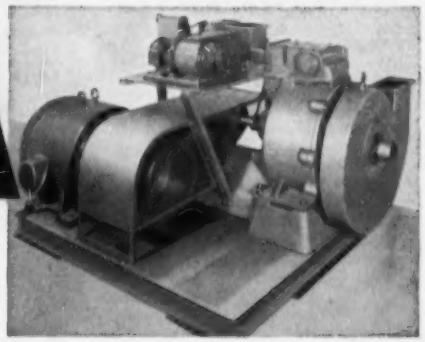
● **AUREOMYCIN is creating a silent revolution in poultry tray-packing by moving the prepackaging of birds from supermarkets to processing plant, says American Cyanamid Co.**

● GEAR TEETH can be forged so accurately by a new German process that they require no machining, asserts

Do You Need ULTRAFINE GRINDING?

FOR UNEXCELLED QUALITY WITH CONTROLLED PARTICLE RANGE

use a **SCHUTZ-O'NEILL PULVERIZER**



Backed by 62 years experience!

If your product must be pulverized to ultrafine specifications and yet have controlled particle size distribution, you'll find proven Schutz-O'Neill "Superfine" Pulverizers best for the job.

Many products that are heat sensitive can be pulverized safely too, because the grinding principle of impact with air attrition keeps product temperatures down and helps control humidity.

Versatility of the Superfine Pulverizers makes them adaptable to the complete range of grinding from coarse to ultrafine. Schutz-O'Neill Superfine Pulverizers are used in the paint industry where ultrafine pigments with close particle size range are vital; by major cocoa powder, sugar, spice and pharmaceutical manufacturers; for emulsifier gums, resin, plastic and seaweed extract powders—wherever unexcelled quality grinding is required. Offered in 6 sizes ranging from 7½ to 125 HP with grinding chambers 12" to 28" in diameter.

FREE TEST GRIND OF YOUR PRODUCT

in our test lab! Tell us your milling requirement—fineness, uniformity, increased output, lower cost—send us a sample of the stock you want to pulverize, state fineness and capacity desired. You'll receive back your processed product plus our Engineering Test Report—there's no obligation.

Send for literature on Schutz-O'Neill Pulverizers

ESTABLISHED 1893 — **SCHUTZ-O'NEILL COMPANY**

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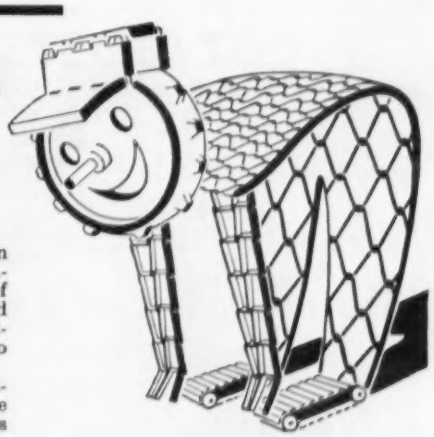
CYCLONE BELTS

can trim production "wastelines"

Nothing is more expensive than waste! Certainly it pays to investigate every possibility of more efficient production and conveying methods. That's exactly what CYCLONE wants to do for you.

By simply mailing the attached coupon, you can have your production methods checked and analyzed by a trained Cyclone Belt representative. After careful study, this Cyclone representative will, if at all possible, show you how Cyclone Processing Belts can help you have more efficient processing methods. The cost is nothing; the benefits can be great. Mail the coupon, today!

Cyclone Processing Belts are available in carbon, alloy, and Stainless Steel in many sizes and patterns.



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AMERICAN STEEL & WIRE DIVISION,
UNITED STATES STEEL CORPORATION, WAUKEGAN, ILLINOIS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

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Dept. H-86, Waukegan, Illinois

Please have your trained representative call on us to discuss our production problems.

Name .....
Company .....
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UNITED STATES STEEL

BOWSER
ESTABLISHED 1885

METERING 1

Bowser meters with ticket printers provide accounting records of liquid receipts, transfers and deliveries.

CUTS COSTS 3 WAYS

CONTROLS INVENTORY

Perpetual inventory and accurate control of process liquids in plant pinpoints profitable operation.

FILTERING 2

Bowser filters of all types are available for filtration of nearly every process or industrial liquid.

IMPROVES QUALITY

Uniformity of color and clarity with better quality control assures efficient processing of finer end-products.

BLENDING 3

Bowser blenders proportion and combine any number of liquid components in a continuous, closed system with highest accuracy at pumping flow rates.

SAVES MAN-HOURS

Hand "batching" is eliminated. Push-button control automates production to cut costs, improve profits.

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Bowser "liquid automation" equipment is available on lease or progressive payments to conserve working capital.

BOWSER PROGRESSIVE PROCUREMENT PLAN

BOWSER NATIONWIDE SALES AND SERVICE

REGIONAL OFFICES: ATLANTA · BOSTON CHICAGO · CLEVELAND · DALLAS · KANSAS CITY LOS ANGELES · NEW YORK

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CUT COSTS WITH SEALTITE

- Delivers a well settled, nicely squared bag at top, bottom and sides
- Pre-scored, double fold, uniformly glued seal keeps product in and dirt out
- Uses any standard make of gusseted bag — no royalties
- Seal readily opened, yet tamper-proof
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- Users report costs reduced up to $500.00 per month per machine

Write for complete information

CONSOLIDATED PACKAGING MACHINERY CORP.

BUFFALO 13, NEW YORK

Product Engineering, a McGraw-Hill publication. The revolutionary cost-cutting improvement, used in Europe for auto and truck gears, is seen having wide applications for all industry.

Action on Standards

Following actions have been taken by the Agricultural Marketing Service (AMS) and Food & Drug Administration (FDA) on U. S. Standards and allowable tolerances of various pesticides on raw agricultural commodities. References are to *Federal Register*.

Peaches, canned clingstone and freestone, extended time for AMS-proposed revision of U.S. Standards, originally published *F.R.*, May 2, p. 4050.

Sweet cherries, canned, AMS proposed amendments for U.S. standards, *F. R.*, June 22, p. 4413.

Spanish-type peanuts, shelled, AMS establishment of revised U.S. Standards, F. R., June 30, p. 4850.

Runner-type peanuts, shelled, AMS establishment of revised U.S. Standards, F. R., June 30, p. 4850.

Virginia-type peanuts, shelled, AMS establishment of revised U.S. Standards, F. R., June 30, p. 4851.

Cranberries, fresh, AMS establishment of U.S. Standards, *F. R.*, July 7, p. 5031.

Apples, AMS amended U. S. Standards, *F. R.*, July 10, p. 5085.

Comb honey, AMS proposed amended U.S. Grade Standards, *F.R.*, July 13, p. 5236.

Shell eggs, AMS proposed amended U.S. Standards, *F.R.*, July 13, p. 5207.

Pasteurized process cheese, pasteurized process cheese food, pasteurized process cheese spread, cold-pack cheese, club cheese, comminuted cheese, and cold-pack cheese food, Standards of Identity, *F. R.*, June 22, p. 4402. Correction, *F. R.*, July 7, p. 5046.

Figs, canned, Standards of Identity, *F. R.*, July 10, p. 5118.

Prune juice, canned, Standards of Identity, *F. R.*, July 14, p. 5288.

On citrus citron, grapefruit, kumquats, lemons, limes, oranges, tangelos, and tangerines, proposed tolerances of 3-(p-chlorophenyl)-1, 1-dimethylurea, *F. R.*, June 19, p. 4294.

On tomatoes, further extended date on which statute shall become effective for use of piperonyl butoxide and pyrethins as a spray, *F. R.*, June 26, p. 4545.

On apples and pears, establishment of tolerances for sodium o-phenylphenate, *F. R.*, June 26, p. 4546.

On Barley, corn, oats, popcorn, rice, rye, sorghum, wheat, exemption from tolerances of carbon disulfide, carbon tetrachloride, ethylene dibromide, and ethylene dichloride, *F. R.*, June 28, p. 4768.

On buckwheat grain, oat grain, and grain sorghum, tolerances of calcium cyanide, *F. R.*, June 28, p. 4719.

On apples, blackberries, blueberries, boysenberries, cherries, crabapples, currants, dewberries, figs, gooseberries, grapes, guavas, huckleberries, loganberries, mangoes, muskmelons, oranges, peaches, pears, pineapples, plums, prunes, tomatoes, peanuts, English walnuts, almonds, cottonseed, beans, peas, barley, oats, flaxseed, rye, grain sorghum, popcorn, corn, wheat, rice, copra, and cocoa, beans, exemption from tolerances of piperonyl butoxide, *F. R.*, June 29, p. 4832.

Withdrawal of petition for establishment of tolerances for residues of Lindane, *F. R.*, June 30, p. 4893.

On grapefruit, lemons, and oranges, exemption from tolerances of diphenyl, *F. R.*, July 6, p. 5016.

On almond hulls, grapes, almonds, apples, broccoli, brussels sprouts, cabbage, cauliflower, grapefruit, lemons, lettuce, mushmelons, oranges, pears, pecans, potatoes, strawberries, and walnuts, tolerances of Systox, *F. R.*, July 6, p. 4999.

On asparagus, citrus citron, grapefruit, grapes, kumquats, lemons, limes, onions, oranges, pineapple, spinach, sugar cane, tangelos, tangerines, tolerances of Monuron, *F. R.*, July 7, p. 5046.

Schedule of Events

August

13–15—International Apple Assn., annual convention; Hotel Dinkler Plaza, Atlanta, Ga.

13–15—American Soybean Assn. and National Soybean Processors Assn., combined annual meeting; U. of Illinois, Urbana.

20–31—Disposal of Industrial Wastes by Biochemical Processes, summer program; Mass. Inst. of Technology, Cambridge.

26–29—National Assn. for the Specialty Food Trade, Annual Fancy Food & Confection Show; Sheraton-Astor Hotel, New York City.

September

5– 7—International Assn. of Milk & Food Sanitarians, annual meeting; Hotel Olympic, Seattle.

10–12—Packaging Institute, annual forum; Hotel Statler, Cleveland.

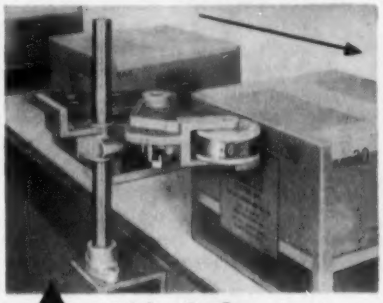
11–14—Packaging Machinery Manufacturers Institute, machinery & materials exposition; Public Auditorium, Cleveland.

12—American Assn. of Textile Chemists & Colorists, symposium on use of colorants in foods; Waldorf-Astoria Hotel, New York City.

17–19—National Assn. of Bakery Sanitarians,

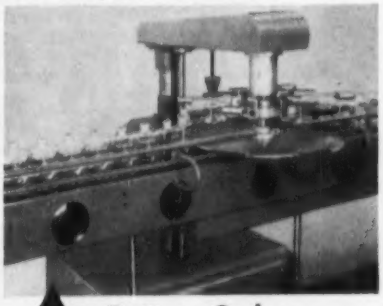
Coding Problem?

There's a Gottscho automatic code-dating machine for every package, every purpose



Side-Coder

This low-cost, friction-driven marker attaches to case-sealer, conveyor, etc. . . . imprints codes, lot numbers, varieties, other legends on side of cartons, cases, drums, filled bags. Model shown (ROLACODER "500" MARKER) codes side and front simultaneously . . . other models code side only or side and rear.



Bottom-Coder

This portable, space-saving unit imprints codes on bottom of jars, bottles, cans, etc. as part of an existing production operation. Imprint surface may be flat or concave, flush or recessed. Wheels right up to the line, can be moved about at will. ("Model TB" MARKO-CODER IMPRINTER).

Other standard Gottscho imprinting machines available for top-coding, label-coding, wrapper coding.

Gottscho

Submit details of your coding problem for appropriate literature and our recommendation.

ADOLPH GOTTSCHO, INC.

Dept. G, Hillside 5, N. J.

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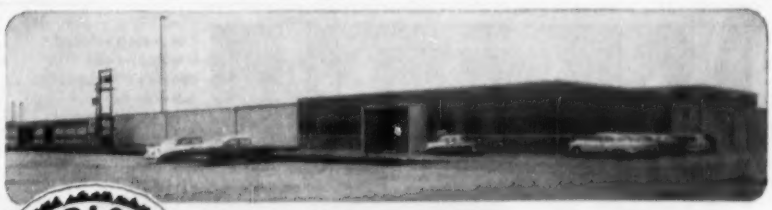
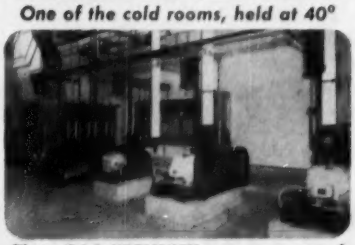
Automatic Production-Line
CODING, MARKING, IMPRINTING MACHINES



FRICK

Refrigeration Serves Big Warehouse in Kansas City

One of the cold rooms, held at 40°



Three Frick "ECLIPSE" compressors and auxiliaries at the Warehouse

The Associated Grocers lately purchased three Frick "ECLIPSE" compressors to cool a freezer room (100 by 75 by 18 ft. high) to 10 degrees below zero, and a cooler room (100 by 25 by 14 ft. high) to 40 degrees. The system, completely automatic, was installed by Smith-Williams Engineering Co., Frick Distributors in Kansas City, Mo. Charles E. Keyser, Architect; Collins Construction Co., General Contractors.

For better air conditioning, refrigerating, ice making, or quick freezing, look to

FRICK CO.
WAYNESBORO, PENNA.

annual meeting; Hotel Morrison, Chicago.

17-21—Instrument Society of America, annual instrument automation conference & exhibit; Coliseum, New York City.

19-21—Minnesota Dairy Products Institute, annual meeting; U. of Minn., St. Paul.

20-30—International Exhibition of Preserved Foods & Food Equipment; Parma, Italy.

23-26—Produce Packaging Assn., annual convention; Miami Beach, Fla.

23-28—Master Brewers Assn. of America, convention & exhibitions; Conrad Hilton Hotel and International Amphitheatre, Chicago.

24-26—American Oil Chemists' Society, fall meeting Sherman Hotel, Chicago.

27-29 National Management Assn., annual meeting & supervisory development conference; Sheraton-Jefferson Hotel, St. Louis.

28-02—American Meat Institute, annual meeting; Palmer House, Chicago.

—End—

Improve Milk Concentrate

—Continued from page 47

duced, heat treatments were more effective in destroying bacteria.

Because of these findings, we reversed the manufacturing procedure. By heating milk to 265-275F. for 3 sec., bacteria were reduced to less than 1 per ml. (standard plate-count method). Then the milk was concentrated, and again heated (to 220F. for 3 sec.), followed by canning under aseptic conditions. Bacteriological examination of finished product showed less than 1 colony per ml.

This new procedure gave encouraging results. The product had a minimum of cooked and chalky flavors. Shelf-life was at least six weeks at 45F.

Extreme care must be exercised, however, in cleaning and sanitizing the equipment to produce a top quality product. Therefore, in-place cleaning was employed on all milk-handling equipment and pipelines. Sanitizing was accomplished by use of steam. Since the evaporator was constructed with an indirect condensing unit to withstand pressures in excess of 10 psi., it was possible to clean and sanitize this unit at the same time the other equipment was being so treated.

Here is the 9-point procedure we developed for manufacture of the improved fresh concentrated milk:

1. Select a high quality, grade A milk containing approximately 3.5% fat and 12% total solids.

2. Heat in tubular unit to 170F., and homogenize at 2,100 psi. with single stage.

3. Using homogenizer as positive action pump, force milk through high-temperature heat-exchanger. Here it is heated to approximately 270F. for 3 sec. before entering the evaporator.

4. Concentrate in evaporator to approximately 36.5% total solids at 100-110F.

5. Pump from evaporator into a well-sanitized vat. Here, product is standardized with sterile water to a total solids content of 36.1%.

6. Pump standardized product through tubular heater to forewarm to approximately 140-145F.

7. Then run through high-temperature heat-exchanger and heat to 220F. for 3 sec.

8. Shock-cool concentrate immediately to approximately 45F., then run it to the aseptic canning system for packaging.

9. Can in 211x414 sanitary-type containers with special lacquer liner.

Consumer Reaction

What does the housewife think of this product?

The Department of Agricultural Economics, U. of Wisconsin, has been conducting consumer-acceptance surveys in Madison and Beloit, Wis., and these cast light on this question.

Technique was to supply fresh concentrate to 919 families in these two cities, along with questions, the housewives agreed to answer. Critical questions dealt with the product as well as with household-use practices, convenience, container preference, and probable price response.

Three-fourths of those who drank it liked it as well or better than fresh fluid milk. When used as a light cream for coffee and for cereal and desserts, reactions were even more favorable.

Sale of the experimental product by the University Dairy Sales Store has been most encouraging.

Several milk-processing groups, with large operations in the state have expressed great interest in the commercial manufacture of 3-to-1 fresh concentrated milk. At present, one operator is installing equipment to process this product on a large-volume basis.

Sales of the concentrate through store outlets, particularly in large cities, has been increasing. Maybe this is because it is cheaper for the consumer to purchase milk in this manner, or because of changes in shopping habits of the American housewife.

Many families buy groceries only once a week or less. With the advent of excellent home refrigerators and freezers, the housewife's trips to food markets are becoming less frequent.

Question: Is the time arriving when the housewife will be willing to

Conveying scalded tomatoes—the cannery's toughest job—at the Lord-Mott Company, Baltimore, Md.

The belt that directly carries scalded tomatoes is attacked by steam, water and intense heat. Each night it must be thoroughly cleaned with live steam. Ton-Tex belting takes this punishment day after day, season after season at Lord-Mott's. Its tightly woven plies of cotton duck are built to fit the job. Do you process or can foods? Ton-Tex belting can cut your conveying costs, too. Our engineers will help you choose the right belt for the job. Write today for complete information.

Conveying costs increased by moisture and heat? Ton-Tex belts will solve your problem save money!

TON-TEX CORPORATION, GRAND RAPIDS 2, MICH.

31 COLUMBUS AVENUE
ENGLEWOOD, NEW JERSEY

759 W. SAN CARLOS STREET
SAN JOSE 26, CALIFORNIA

TON-TEX CONVEYOR AND TRANSMISSION BELTING

TON TEX

every old crow thinks her babe is Bee-u-tiful

"Mother-Love" sometimes, and quite naturally, rationalizes the poor sales behavior of a food product where flavor and eye appeal may be out-of-step with changes in consumer preferences.

It is important to know the truth about *your* product...it is just as important to know what to do about the truth! May we suggest "Better Check with STANGE and Be Sure."

The **WM. J. STANGE CO.**, *Manufacturers of Seasonings and Food Color, extends to the Food Industry a three-fold service involving Flavor and Color Improvement—Product Development —New Product Suggestions. Any or all three services are available through a Stange representative or by letter.*

BETTER CHECK WITH STANGE AND BE SURE

50-A MICRO-GROUND SPICE CREAM OF SPICE SOLUBLE SEASONING GROUND SPICE
IDGA ANTIOXIDANT PEACOCK BRAND CERTIFIED FOOD COLOR

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MEXICO: Stange-Pesa, S. A.—Mexico City

Litho in U.S.A.

here's how you "govern" the government

Much as we revere and respect this system of ours, we don't want the government running our lives.

The best government is one that's closest to the people. And there's just one way to keep it under control.

Vote.

Every time you get a chance.

Vote November 6, for sure.

Vote to elect the ones you want representing you. To keep the ones who are doing you proud. To get rid of the ones who are not so hot.

You're the boss, however you vote. No matter who's elected, you pay their salaries and paint their offices and keep watching over them as they work.

Even if the ones you're "agin" happen to win, they're obligated to the minority, too. They're servants of *all* the people, not just those who voted for them.

Your vote prods, approves, protests, demands, restrains, rewards.

Vote—so you and your children after you always can.

See You at the POLLS!

purchase the family's fluid milk supply as she does other foodstuffs—once a week or less?

If so, this improved fresh concentrated milk may be the answer.

The above article has been approved for publication by the Director of the University of Wisconsin Agricultural Experiment Station. Research has been supported, in part, by a grant from the United States Steel Corp.

End (Resume reading on page 48)

Robotized Movement

—Continued from page 45

The central control panel of the conveyor system is located adjacent to the bread-oven discharge point. It is usually actuated by the oven operator.

Electro-mechanical controls of the conveyor-selector automatically perform three sequential operations. First, when the operator shuts down a slicer-wrapper unit, a time-delay stops the roller-conveyors on the hinged conveyor feeding to a fixed conveyor.

The roller conveyors are then reversed so that the flow of loaves will not continue to drop off the conveyor. The drop-through is now opened. Then the automatic selector shifts its conveyor to connect with the one which will feed the now-operating stand-by units. The drop-through on this line has been automatically closed to complete the conveying line.

Thirteen Microswitches (Minneapolis-Honeywell) are arranged in interlocked series to control the operation of the selector. Three of them control the following operations: Cooler and selector-conveyor product input to selector, setup of product holding time; reversing of rollers of selector-conveyors, start-stop for the tier of three fixed conveyors, and actuation of the master switch.

An interlocked fuse system protects all 13 of the motors in this conveyor system from thermal overloads. If one motor kicks-out, all automatically are shut down.

Step-by-Step Operation

After the conveyor system has been started, the selector system is activated by the slicer-wrapper operator. Of the three slicer-wrapper units, one is a stand-by.

Flow is automatically shifted merely by pressing the stop button on a slicer. This cuts off the feed to the down unit. The selector system then automatically shifts this conveyor to the one that will feed the stand-by. A second button locks the selector conveyor in place.

Flow is shifted (1) when it is necessary to install a new roll of wrapping paper, (2) in the occasional event of a break-down or jam-up, or (3) when a new machine setup is made for a different size loaf.

Of these three types of shut-downs, the most frequent is that of changing paper (about every 18 min.). This requires about 30 sec. For a machine setup change about 5 min. is needed.

Bread moves from the cooler at the rate of about 120 loaves a minute on two powered stainless roller-conveyors. The entire conveyor system is powered. Tray-unloaders (instead of tip-trays) slide the bread from cooler-trays onto the conveyors, and the loaves move in propor position from this point, through the entire system, to the slicers.

End (Resume reading on page 46)

Know Your Valves?

—Continued from page 77

Solution to this is to grind the valve hot, using a torch or ring of hot metal in contact with the disk to raise temperature.

To test disk-seat lap, put pencil marks at half-inch intervals around the seat and drop disk lightly on it, rotating about one-quarter turn. If all pencil marks rub off, seating is satisfactory.

Valves with composition disks are serviced by merely replacing the disk insert. Here, the proper disk is needed for each job.

Asbestos composition is often used for saturated steam, air, gas, hot water, and condensate. Leather and rubber disks do a good job for cold water and other liquids. A special soft metal is used for air, gasoline, and oil applications.

To keep lubricated plug valves tight, it is generally only necessary to clean, inspect, and reassemble them with new packing and gaskets. They should be cleaned with an alkali or solvent.

On plug valves having integral shanks, examine the machined shank for diameter, and the adjacent shoulder for wear.

At times, plugs should be lightly re-lapped to eliminate scaly deposits, scoring, and pitting. If badly worn, you may have to rebore the body and fit it with an oversized plug.

Or, you can build up the plug surface with weld metal, then turn plug down in a lathe and lap it in.

Replacement plugs are furnished oversize with a semi-finished taper that allows fitting them to re-bored bodies.

End (Resume reading on page 78)

STEEL

Every Kind

Quick Delivery

Plates, Structurals, Bars, Sheets, Tubes, etc. Carbon, Alloy, Stainless Steels, Babbitt Metal.

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Joseph T. Ryerson & Son, Inc.
Plants at: New York • Boston • Wallingford, Conn. • Philadelphia • Charlotte, N. C. • Cincinnati • Cleveland • Detroit Pittsburgh • Buffalo • Chicago • Milwaukee St. Louis • Los Angeles • San Francisco Spokane • Seattle

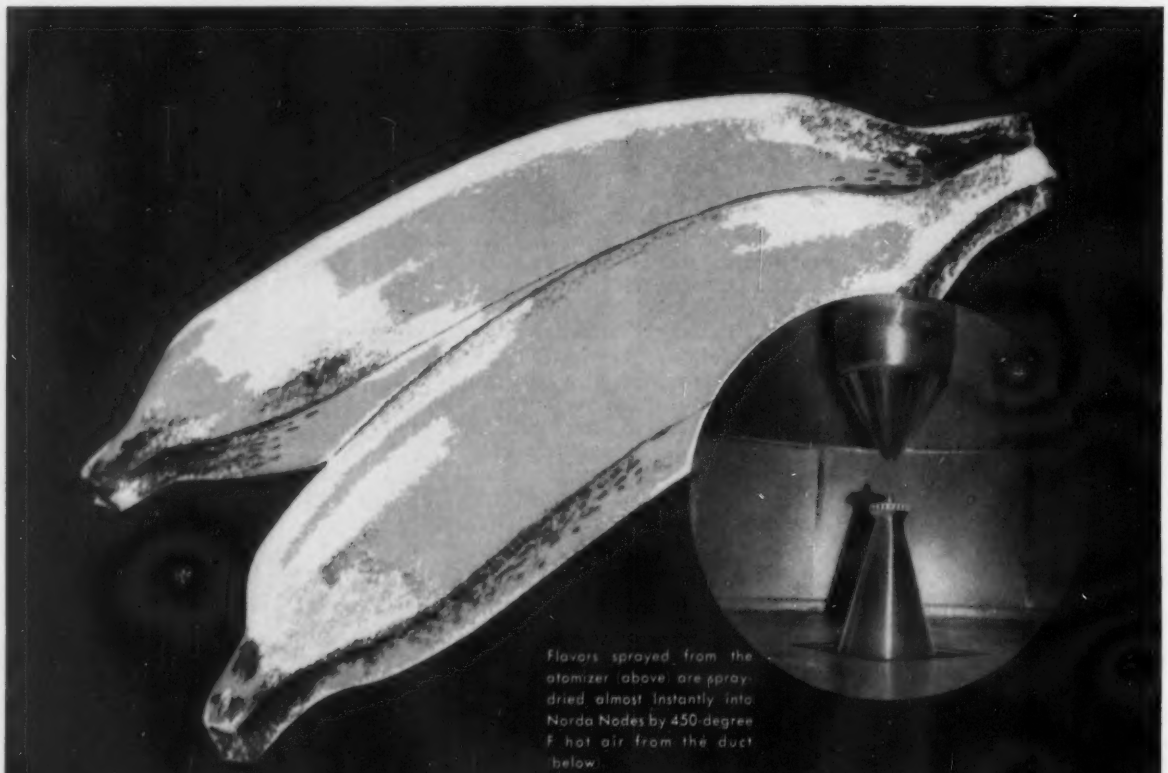
Modernizing Conveyor Lines?

CHECK Weld-Bilt STEEL-BELT CONVEYORS

Custom-engineered to your exacting needs, Weld-Bilt "moving belts of interlocking steel — or stainless steel" offer profitable advantages. Positive tracking, they connot weave, buckle, stretch or creep. Friction-free, they run on ball bearing rollers, from positive slip-proof motor drive. And, best of all, they offer *unlimited life.*

Call a Weld-Bilt engineer to help you plan new conveyor lines — or other modern materials handling equipment. Just drop a note.

WEST BEND EQUIPMENT CORP.
MATERIALS HANDLING ENGINEERS
349 WATER STREET, WEST BEND, WISCONSIN



Flavors sprayed from the atomizer above are spray-dried almost instantly into Norda Nodes by 450-degree F hot air from the duct below.

Nothing's known like Norda Nodes . . . spray-dried for you by Norda

You are using Norda Nodes if excellence excites you. You'll be using these very fine spray-dried flavors because they will make your good products sell better.

Only Norda makes Norda Nodes. Only Norda knows how to—using skills and experience and competence long known in the flavor business. Norda engineers are responsible for refinements in the modern machines that make Norda Nodes, and lock in these tiny, colloid-coated flavor "grains" the original true-fruit richness that gives your products permanent, stable, unchanging, *real-tasting* flavors.

All Norda Flavors have quality. Choose any with confidence; it will help you improve any flavored product you want to be proud of.

Send your letterhead for free samples today.

"Flavor it with a Favorite"— Norda Nodes

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Recent Inventions

PRODUCTS

Egg Substitute for Baked Goods by Mixing at 60C. Calcium Sequestering Agent With Dairy Protein Source in Acid pH Range, Raising pH Above 7—K. Kumetat, Cheltenham, to Commonwealth Scientific & Industrial Research Organization, E. Melbourne, Victoria, Australia. No. 2,739,898. Mar. 27, 1956.

Quick-Cooking Rice by Steaming Hulled Grains, Drying—A. K. Ozai-Durrani, Stuttgart, Ark. No. 2,740,719. Apr. 3, 1956.

Sugar-Base Confection containing Lecithin and Proteinaceous Residue of Ethyl Alcohol-Extracted Soya — A. A. Horvath, Princeton, N. J. No. 2,740,720. Apr. 3, 1956.

Potato Granules by Drying Cooked, Mashed Particles in Warm Air to 40-45% Moisture—J. C. Hall Miers, Concord, Calif., to USA. No. 2,742,847. Apr. 24, 1956.

Apple Sauce by Removing Blossom Ends of Unpeeled Fruit, and Uncored Fruit, Coating With Oxidation-Inhibitor Solution, Chopping, Removing Seeds and Stems, Shredding, Pressure-Cooking, Adding Sugar, Finishing—E. G. Grab, Silver Springs, Md. No. 2,744,016. May 1, 1956.

PROCESSES

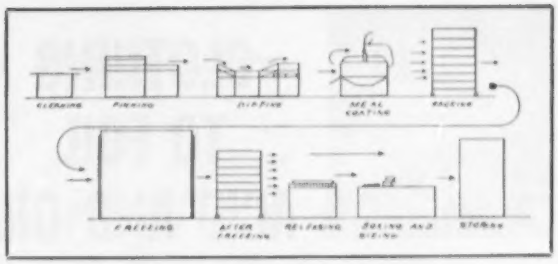
Aligning Stem-Blossom Axis of Pears for Stemming by Gravity Feeding, Stem End First, Into Fruit-Receiver, Centering, Then Gripping, Releasing, and Regripping Bulb End—W. De-Back and S. Puccinelli, San Jose, and R. A. McCloud, San Lorenzo, to Food Machinery & Chemical Corp., San Jose, Calif. No. 2,738,819. Mar. 20, 1956.

Forming Frozen Confections by Feeding Plastic Material Into Spout, Cutting, Dropping Portions Onto —30-F. Surface—C. K. Nelson, Los Angeles, to Eskimo Pie Corp., Bloomfield, N. J. No. 2,739,545. Mar. 27, 1956.

Producing Citric Acid by Submerged Fermentation—S. M. Martin to National Research Council, Ottawa, Ontario, Canada. No. 2,739,923. Mar. 27, 1956.

Accelerating Curing of Meat With Acidic Water-Soluble Enediol Compound—C. M. Hollenbeck, Woodbridge, to Merck & Co., Rahway, N. J. No. 2,739,899. Mar. 27, 1956.

Coloring Citrus Fruit by Cold and Hot Washing, Applying Edible Fat Dye, Spraying With



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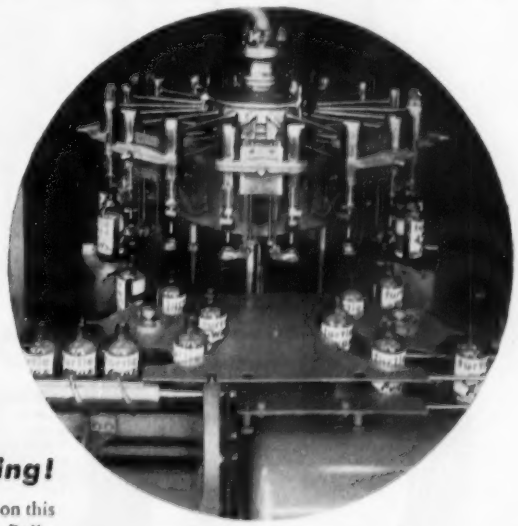
Shrimp are cleaned and deveined, then individually suspended on pinning bars. Latter are inserted in racks that carry product through subsequent processing. After passing through a dipping zone, in which shrimp are batter-coated, they are breaded in an air stream containing comminuted meal. Next, racks are placed on mobile members and conveyed through a quick-freezing zone. Then shrimp (not frozen to each other) are released from pinning bars, packaged, and sent to refrigerated storage.—*J. O. Hice and J. J. Meadows, to Seapak Corp., St. Simons Island, Ga. No. 2,740,721. Apr. 3, 1956.*

PNEUMATIC

Rotavac



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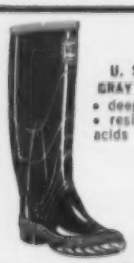

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Extract of Ripened Fruit Peel —H. A. Toulmin, Jr., to Commonwealth Engineering Co. of Ohio, Dayton. No. 2,739,897. Mar. 27, 1956.

Detoxifying Seed Meal by Heating With Aqueous Inorganic Salt Solution—E. Eagle and F. A. Norris, to Swift & Co., Chicago. No. 2,740,718. Apr. 3, 1956.

Cleaning Bake Pans by Extracting Incrustations With Hot Chlorinated Ethylene Vapors, Applying Hot Aqueous Alkali Metal Tripolyphosphate Solution, Washing With Water Under Pressure—C. S. Dinley, Jr., and I. J. Duncan, to Detrex Corp., Detroit. No. 2,740,734. Apr. 3, 1956.

Purifying Monoglycerides by Extracting With Heated Short-Chain Aliphatic Ketone, Cooling, Separating—H. H. Young, Western Springs, and H. C. Black, Chicago, to Swift & Co., Chicago. No. 2,740,799. Apr. 3, 1956.

Transferring Cans from Retort to Conveyor by Submerging Latter in Water Bath, Lowering Loaded Baskets Near Conveyor, Inverting—G. B. Stryker, Fullerton, Calif., to Hunt Foods, Inc., Los Angeles. No. 2,741,379. Apr. 10, 1956.

Preserving Bananas by Removing Skin and Seeds, Heating, Quick Freezing—L. Reale, La Ceiba, Honduras. No. 2,741,560. Apr. 10, 1956.

Unloading Cans From Carton by Device That Grips Flap, Inverts Carton—W. A. Gueffroy, Roslyn Heights, N. Y., to American Can Co., New York City. No. 2,741,380. Apr. 10.

Recovering Broken Cereal Kernels From Weed Seeds by Tempering Mixture, Breaking, Separating—R. Moen, Minneapolis, to General Mills, Inc. No. 2,742,235. Apr. 17, 1956.

Processing Nut Meats by Applying Molten Bonding Agent Comprising Partial Ester of Aliphatic Polyhydric Alcohol and Higher Fatty Acid, Solidifying—H. F. Neumann, S. Orange, to Colgate-Palmolive Co., Jersey City, N. J. No. 2,742,364. Apr. 17, 1956.

Curing Meat by Subjecting Product (in Contact with Curing Solution) to Alternate Cycles of Simultaneous Vacuum and Mechanical Pressure, Then to Atmospheric Pressure and Reduced Mechanical Pressure —A. Bachert, Essen, Germany. No. 2,742,367. Apr. 17, 1956.

Extracting Oil From Mature Coconut by Pressing, Centrifuging, Freezing, Heating, Centrifuging, Separating—P. Robledano to Coconut Processes Inc., Manila, Philippine Republic. No. 2,742,487. Apr. 17, 1956.

Rendering Animal Fats by Denaturing Fat-Splitting Enzymes, Disintegrating, Deaerating, Admitting Inert Gas, Heating, Separating—E. J. Dufault, Weston, to Canada Packers, Ltd., Toronto, Ontario, Canada. No. 2,742,488. Apr. 17, 1956.

Dehydrating, Defatting Animal Tissue by Comminuting, Forming Into Thin Bodies, Distilling—F. G. Low, Unionville, Pa., to E. I. du Pont de Nemours & Co., Wilmington. No. 2,742,489. Apr. 17, 1956.

PACKAGING

Cone-Top-Can Carrier Consisting of Upper, Lower Top Walls With Openings for Can Necks, Inclined Members Secured to Opposite Edges of Lower Top Wall, Vertical Strip Connected to Lower Edges of Inclined Walls—P. A. Toensmeier, Hamden, to New Haven Board & Carton Co., New Haven, Conn. No. 2,737,326. Mar. 6, 1956.

Bag Weighing, Filling Unit Comprising Scale, Inclined Weighing Chute, Gate—F. F. Lindstaedt, San Anselmo, and F. S. Wright, Sonoma, Calif. No. 2,738,944. Mar. 20, 1956.

Biscuit Packager Employing First Conveyor Having Open-Bottom Pockets, Second Unit Carrying Open-Top Trays, Transfer Station, Stack-Gripping and Lowering Means—A. Hopton and A. Russell, Yorkshire to Forgrove Machinery Co., Ltd., Leeds, England. No. 2,739,433. Mar. 27, 1956.

Egg-Case Separator Comprising Rectangular Molded Pulp Having Upstanding Flanges, Triangular Cleats—G. S. Wolf to Diamond Match Co., New

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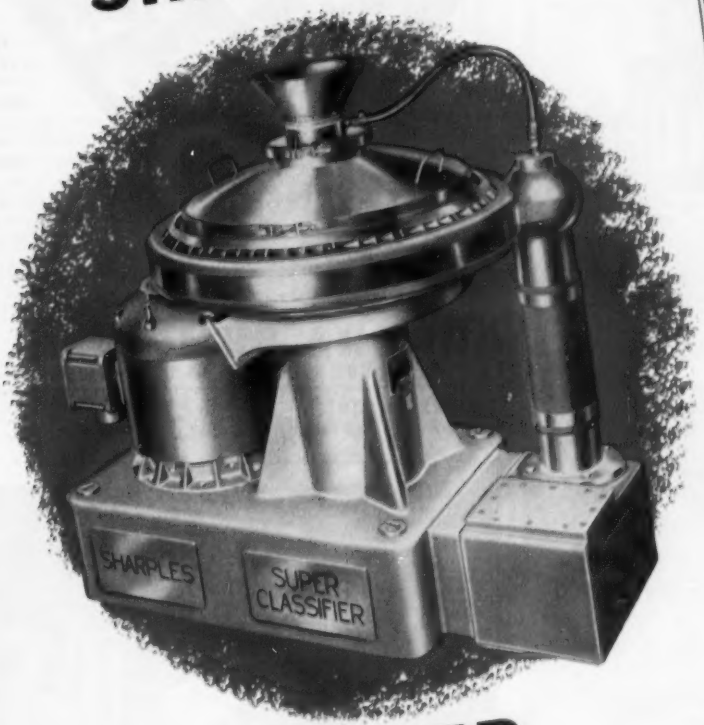

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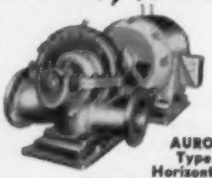

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York City. No. 2,739,753. Mar. 27, 1956.

Carton-Flap Closer With Upright Guides, Swingable Arms—H. E. Dobson, Five Dock, M. S. W., Australia. No. 2,739,513. Mar. 27, 1956.

Molded-Pulp Egg Carton Including Rows of Cells, Inner Cover Section With Apertures, Swingable Non-Cellular Outer Cover—J. W. Cox, Chicago, to Diamond Match Co., New York City. No. 2,739,750. Mar. 27, 1956.

Bag Sealer Employing Revolving Table, Open Bottom Enclosures, Sealers, Fingers—R. A. Mahaffy, Cedar Grove, N. J., to Standard Packaging Corp., New York City. No. 2,740,243. Apr. 3, 1956.

Individual Cream Carton of Rectangular Shape Having Continuous Flanges Adhesively Secured to Side Walls, Releasable Tabs, Tear Lines, Pouring Spout—F. L. Carter, Ft. Belvoir, Va. No. 2,740,573. Apr. 3, 1956.

Sorter, for Detecting and Ejecting Improperly Labeled Cans, Employing Can Track, Endless Flexible Detector, Electrically-Operated Ejector—M. L. Box, Buena Park, and R. W. Cason, Fullerton, Calif., to Merrel Mfg., Fullerton, Calif. No. 2,741,365. Apr. 10, 1956.

Container Inner Coating Comprising Polymers of Conjugated Hydroxylated Diolefins, Their Unsaturated Fatty-Acid and Polybasic-Acid Esters, Oils, Thinners, Driers—J. A. Shotton, Bartlesville, Okla., to Phillips Petroleum Co. No. 2,741,397. Apr. 10, 1956.

Popcorn Package Consisting of Flexible-Sheet Bag, Angular Partition Defining First Compartment Containing Solidified Popping Oil, Second Section Having Raw Popping Corn—B. B. Banowitz to TV Time Foods, Inc., Chicago. No. 2,741,559. Apr. 10, 1956.

EQUIPMENT

Temperature Controller for Sugar Mingler—C. A. Olcott, W. Milford, N. J. No. 2,739,087. Mar. 20, 1956.

Flow-Control Valve for Water Softener—T. R. Stoner, Milwaukee. No. 2,739,119. Mar. 20, 1956.

Poultry Apparatus for Opening and Cleaning Gizzards Having Rotating Feed, Stationary Knife, Synchronizing Means—S. Kristmann and M. Mueller to Krist Engineering & Mfg. Corp., Chicago. No. 2,739,345. Mar. 27, 1956.

Fowl-Tendon Puller Comprising Anchoring Member, Reciprocating Carriage, Leg Grasping and Discharge Means—W. L. Martin and G. R. Shadley, Ottumwa, Iowa. No. 2,739,346. Mar. 27, 1956.

Poultry Shackle Containing Swingable Jaws, Reciprocable Handle, Spring and Cam Means—A. W. Sharp and E. Crane to Barker Poultry Equipment Co., Ottumwa, Iowa. No. 2,739,347. Mar. 27, 1956.

Coconut Splitter Consisting of Vertically Moving Blade, Fruit Holder, Power Means—H. V. Rey, Papeete, Tahiti. No. 2,739,630. Mar. 27, 1956.

Confection Freezer Employing Dasher, Refrigerant Circulatory System, Controls—E. Thompson, Jr., New Rochelle, N. Y., to Emory-Thompson Machine & Supply Co., New York City. No. 2,740,264. Apr. 3, 1956.

Jacketed Cooling Tank With Refrigerant Compressor, Condenser—L. Buehler, Jr., Evanston, Ill., to Creamery Package Mfg. Co., Chicago. No. 2,740,269. Apr. 3, 1956.

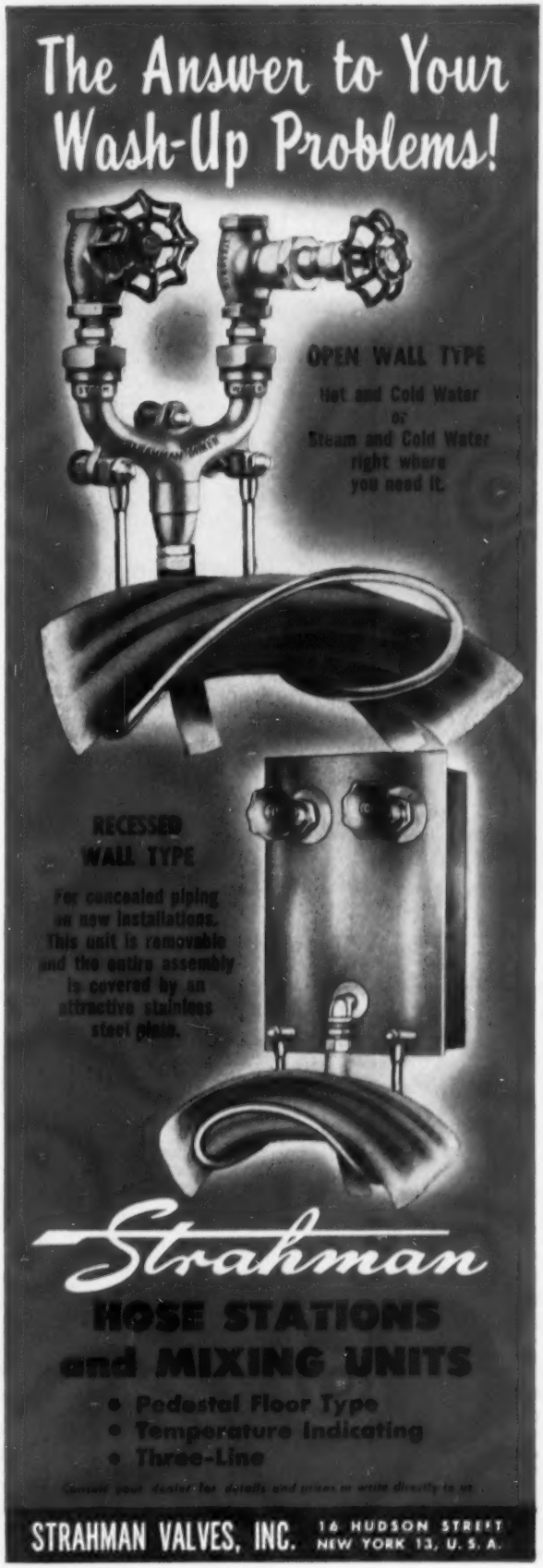
Dough Divider, Panner Including Rollers, Fluid-Injecting Means, Extruder, Pump, Conveyor, Revolving Ring With Wire—I. Elliott, Croton-on-Hudson, N. Y., to A. S. Schmidt, Harrisburg, Pa. No. 2,740,362. Apr. 3, 1956.

Washing Machine for Bakery Pans—N. W. Halsey, Jackson Heights, N. Y. No. 2,740,416. Apr. 3, 1956.

Date Pitter Comprising Holder, Hollow Ejector Rod With Socketed Point, Actuating and Steam-Injecting Means—J. F. Wright, Indio, Calif. No. 2,740,440. Apr. 3, 1956.

Fruit Preparation Unit for Pear Feeding, Peeling, Halving, Seed Celling, Trimming—B. C. Coons to Food Machinery & Chemical Corp., San Jose. No. 2,740,441, Apr. 3, 1956.

Pan Greaser Consisting of Conveyor, Gate, Trigger, Mask, Locater, Actuating Means—G. E. Tench, S. Pasadena, and E. J. Williams, Burbank, Calif., to Read Standard Corp. No. 2,741,214. Apr. 10, 1956.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Men & Companies

Lloyd A. Hall, technical director of Griffith Laboratories, Inc., is recipient of the 1956 Honor Scroll Award of the Chicago Chapter, American Inst. of Chemists.

Industry

Butoni Foods has formed a new subsidiary—Gourmet Imports Inc.

California & Hawaiian Sugar Refining Corp., San Francisco, reports acquiring 25% interest in Imperial Sugar Co., Sugar Land, Tex.

Carling Brewing Co. announces purchase of the International Breweries Inc.'s, Frankenmuth, Mich., plant.

C & C Super Corp. has sold its Nedicks chain to the newly formed Nedicks Stores, Inc.

Chunky Chocolate Corp., of Brooklyn, has been appointed sole U. S. marketing agents for Rowntree & Co., Ltd., York, England.

Columbia River Packers Assn., Inc. and **Hawaiian Tuna Packers** have jointly approved a merger—subject to stockholders approval.

Cranberry Growers, Inc. has changed its name to **Indian Trail, Inc.**

General Seafoods Ltd., subsidiary of General Foods Corp., has sold its Halifax seafood processing plant to National Sea Products Ltd.

Jos. Schlitz Brewing Co. announces acquisition of George Meuhleback Brewing Co., subject to approval of Meuhleback stockholders.

Ralston Purina Co. will build a modern feed-manufacturing plant in Louisville.

Personnel

Gerald D. Bartem is the new director of byproduct sales for Minute Maid Corp.

Saul S. Blumenthal is the newly appointed director of research for Dietetic Food Inc., Brooklyn.

Robert H. Davidson has been appointed national sales manager of General Foods Corp.'s Jell-O div.

Edward A. DeLima, v.-p. of Lowry & Co., is now pres. of the Sugar Club of N. Y.

W. C. Dickmayer has been elected board chairman of the National Confectioners Assn., and **Philip P. Gott** has been re-elected pres.

Harry O. Diesl is new v.-p. of Piel Bros.

J. Roy Duggan, v.-p. of the SeaPak Corp., has been elected pres. of the Southern Fisheries Assn.

Oscar C. Gorenflo has been appointed director of institutional operations for the Tea Council.

Henry Hohwiesner, Starr Foods, Inc., Salem, Ore., is new pres. of Purple Plum Assn.

Cecil L. Hudnall is newly appointed pres. and chief exec. officer of International Standard Brands.

Thomas Keefan is new production supt. for Kitchens of Sara Lee, Inc., Chicago.

Bruno Jahn is new packaging director of Lucky Lager Brewing Co.

Frederick H. Leonhardt, Jr., has been elected pres. of Dodge & Olcott, Inc.

Sherlock McKewen is now a director of S&W Fine Foods, Inc.

Roy W. Moore, Jr., has recently been elected exec. v.-p. and gen. mgr. of Canada Dry Ginger Ale, Inc.

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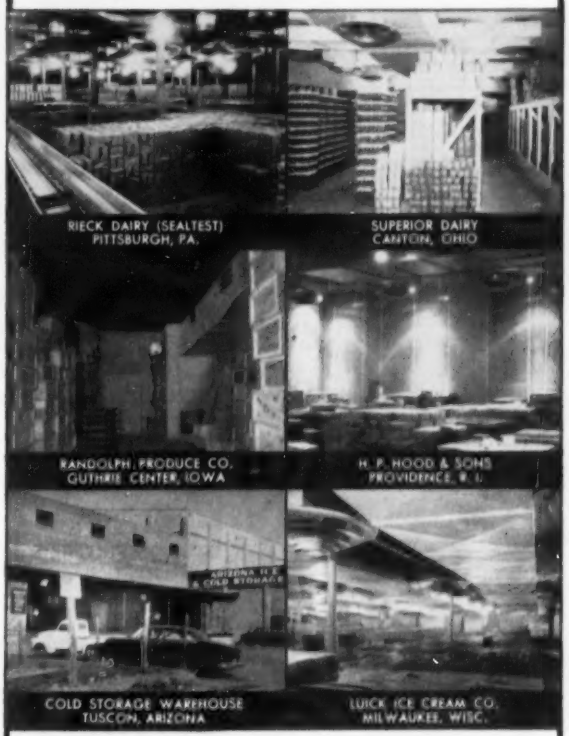

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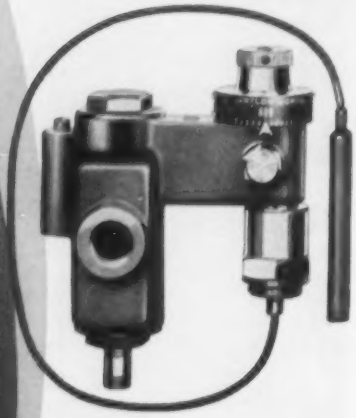

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Ralph Nims is the new v.-p. of marketing for Canada Dry.

Edward J. Noble is named board chairman and exec. officer of newly formed Beech-Nut Life Savers, Inc.

Dr. W. Parker Pierce has been appointed director of sanitation for Arnold Bakers, Inc., Port Chester, N. Y.

O. I. Powell and **G. F. Wagner** have been appointed v.-p. of engineering, and v.-p. of brewing activities, respectively, for Carling Brewing Co.

Sidney C. Rowe is new pres. of Borden's Farm Products of New Jersey, Inc., and chairman of Borden Co.'s Middle Atlantic Fluid Milk Region.

Raymond E. Rowland has been named pres. of Ralston-Purina Co.

Thomas M. Ryan has been elected pres. of Waples-Platter Co.

Lloyd Skinner, pres. of Skinner Mfg. Co., Omaha, has been elected pres. of National Macaroni Manufacturers Assn.

Robert B. Smallwood and **Carl T. Wood** have been elected chairman-chief exec. and pres., respectively, of Thomas P. Lipton Inc.

M. C. Somerall is named v.-p. of Pepsi-Cola Co. of Canada Ltd.

Frank C. Staples is the newly elected pres. of American Molasses Co.

Gerald B. Thorne, v.-p. of Wilson & Co., Inc., has been awarded an Honorary Doctor of Laws degree by the U. of Missouri.

Holland B. Judkins, v.-p., Coca-Cola Co., and chairman of board of company bottling subsidiaries on east and west coast has retired after 26 yr. with company.

Grover A. Whalen has been elected pres. and dir. of Trans Continental Industries, which recently acquired the Golden Gift citrus firm.

John L. Wilson is now exec. v.-p. of Anheuser-Busch, Inc.

Howard E. Williams has been appointed v.-p. in charge of marketing of E. & J. Gallo Winery, Modesto, Calif.

Deaths

James M. D. Brown, 59, chief chemist—Revere Sugar Refinery.

Dr. Ray W. Clough, 70, asst. dir. and chief chemist—National Canners Assn., Seattle.

Walter A. Estus, 85, v.-p. and gen. mgr.—Cook Inlet Packing Co., Seldovia, Alaska.

Dr. William H. Haskell, dir. of programs—Kenzade Products, Inc.

William J. Kennedy, 80, founder — William J. Kennedy Dairy Co., Detroit.

Herman J. Krieger, 72, gen. supt.—Curtiss Candy Co.

John F. Lazier, 61, sec.-treas. —J. F. Lazier Mfg. Co.

Jean D. Patton, 58, v.-p.—Morton Frozen Foods.

Frederick S. Snyder, 88, former pres.—Batchelder & Snyder, Boston.

Associated Industries

American Can Co. has opened a new plant in Salem, Ore., to serve the area packing blue lake string beans.

Anchor Hocking Glass Corp. announces appointment of R. N. DeMerell and E. M. Lawrence as v.-p.'s in charge of national packaging accounts, and sales admin.

Arthur D. Little, Inc., Cambridge, Mass., announces appointment of A. E. Krebs, Jr., as v.-p.

Bradley Container Corp. announces retirement of its pres. and founder—Bradley Dewey.

Columbia-Southern Chemical Corp. has elected three new directors—C. F. Bingham, W. E. Phillips, and H. B. Brown.

Russell J. Hug (right) is new president of General Baking Co., where he will supervise firm's 96 installations in 31 states. He's seen here with **Board Chairman G. L. Morrison** (left) paying honors to **V.-P. J. Adamsen** (center), who is now retiring after 44 yr. with organization.

Continental Can Co. announces three moves: Acquisition of Canadian Crown Cork Co., Ltd.; formation of a new aluminum container unit (Cochran Continental Container Corp., owned jointly with Cochran Foil Co.); and building of a beer can plant in Maspeth, N. Y.

Crescent Metal Products, Inc., announces appointment of John Phelps as sales mgr.

Crown Zellerbach Corp. has a newly-integrated div. named —Western-Waxide Specialty Packaging Div.

Dean Chemicals, Inc., has purchased the dry ice and liquid carbon dioxide operations of Cardox Corp. in Michigan. The two companies will be combined under a new name—Dean-Cardox Chemicals Corp.

Despatch Oven Co., Minneapolis, announces appointment of Gorden L. Schuster as pres. and gen. mgr.

Dorr-Oliver Inc. announces appointment of Equipment Engineers, Inc., as its exclusive industrial-pump rep. in eastern Pa., northern Del., and southern N. J.

Fischer & Porter announces appointment of James F. Haskett as asst. gen. mgr.

Flodar Corp. has moved to larger quarters in Cleveland.

Food Machinery & Chemical Corp. announces election of Paul L. Davies as chairman and chief exec. officer.

Hunter Mfg. Co. has moved into a new plant in Solon, Ohio.

Raybestos-Manhattan, Inc., now announces appointment of J. Stewart Munro as pres., and Douglas Pocock as v.-p. of replacement sales.

RCA appoints Mulhern Co. as west coast distributor for automatic bottle and can uncasing machines.

Ritz Mfg. Co. announces opening of new facilities in West Chester, Pa.

R-W Paper Co. has completed a paper mill at Longview, Wash.

Safety Car Heating & Lighting Co., Inc., New Haven, has changed its name to **Safety Industries Inc.**

Thermoid Co., Trenton, N. J. announces appointment of John A. Muller as dir. of research and development.

Thermo King Corp. is the new corporate name for U. S. Thermo Control Co. It has also purchased a new 90,000 sq. ft. plant in Minneapolis.

United States Air Conditioning Corp. has moved its main plant and offices from Minneapolis to Philadelphia.

Van Amerigen-Haevler, Inc. announces election of Chester F. Smith to the board.

Voss Belting & Specialty Co., Chicago, manufacturer and supplier of special conveyor belting for food industry, announces appointment of Henry W. Voss as v.-p.

Western Precipitation Corp. announces promotion of Norman M. McGrane to chief technical engineer, and his election to the board.

Yale & Towne announces appointment of George A. Smith as production mgr. for its materials handling div.

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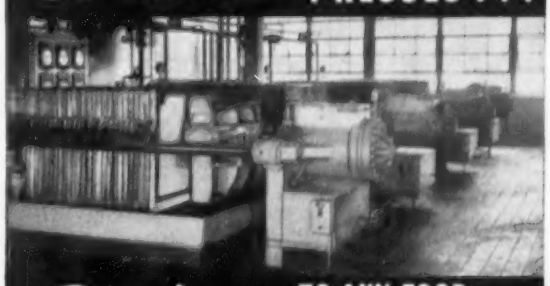

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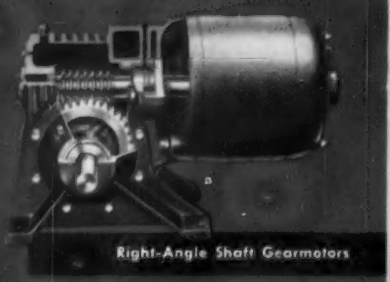
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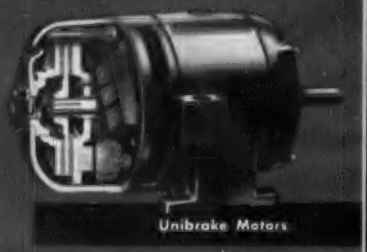
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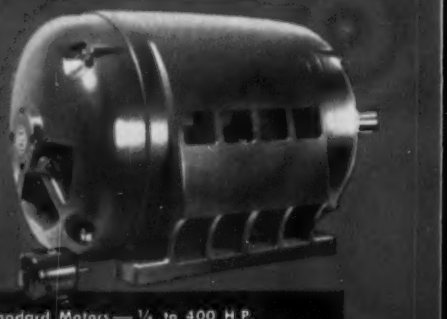
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PLANT ENGINEERING

Electrostatic Air Cleaner

Covers features of a self-charging electrostatic air cleaner for handling unusually high dust concentrations. Unit contains Saran screen and glass fiber mat that stop both large and small particles. Machine operates at temperatures to 212F. 4p.—Goodyear Tire & Rubber Co., Akron, Ohio. (187A)

Heating-Cooling Units

Treats of a 13-model series of industrial heating and cooling units for air conditioning food plants. Table lists pertinent data for the Freon, direct-expansion systems. Catalog C-R 5632, 2p.—National U. S.-Radiator Corp., Drayer-Hanson Div., Los Angeles. (187B)

Nickel Alloy Tubing

Provides handbook information on properties and workability of nickel and nickel-alloy tubings. Extensive charts give wide engineering data. Catalog 12, 20p.—Superior Tube Co., Norristown, Pa. (187C)

Magnetic Drums

Shows application of powerful non-electric magnetic drums in ingredient chutes. Units are self cleaning. Non-magnetic material discharges first, tramp iron is held against drum shell until it passes out of magnetic field. Bulletin B54-1, 4p.—Eriez Mfg. Co., Erie, Pa. (187D)

Hydraulic Pinch Valve

Concerns operation of a pinch-type valve that is throttled and closed with hydraulic pressure. Performance curve shows advantages of the unique system. Bulletin 65, 4p.—Equipment Engineers, Inc., San Francisco. (187E)

Fly Ash Collector

Describes operative advantages of a regenerative, fly-ash-collecting system for use on induced-draft boilers. Drawings illustrate installation and action. 6p.—Breslove Separator Co., Pittsburgh. (187F)

Unit Heaters

Comprehensive catalog gives full selection and application facts for a series of horizontal and vertical, unit heaters. Also included are dimension and performance tables for hot water and steam heating mediums. Bulletin 700A, 33p.—American Air Filter Co., Inc., Louisville, Ky. (187G)

Multi-Service Company

Pocket folder briefs available services and products. Describes custom fabrication of equipment, storage and material-handling leasing, and other features. 16p.—General American Transportation Corp., Chicago. (187H)

Inline Motor-Pump

Specifies unique features of a motor-pump combination that installs directly in process lines. The 8-in. unit handles corrosive and non-corrosive fluids at heads to 21 ft., capacities to 21 gpm. Bulletin 1060, 4p.—Chempump Corp., Philadelphia. (187I)

Evaporative Condensers

Details construction and operation features of a 22-model line of evaporative condensers. Units range from 10 to 350 tons, and adapt to Freon 12, Freon 22, and ammonia refrigerants. Bulletin 102, 12p.—Baltimore Aircoil Co., Inc., Baltimore. (187J)

Industrial Filters

Concerns cost-saving features of two types of industrial filters for process liquid and water applications. One type adapts to batch or continuous processing, and is available with or without filter-aid-precoat and feed attachment. Bulletin 651, 10p.—R. P. Adams Co., Inc., Buffalo. (187K)

Plastic Pipe & Fittings

Lists physical properties, dimensions and weights, maximum working pressures, and other engineering data for a line of unplasticized, polyvinyl chloride pipe and fittings. Facts point up high corrosion resistance of this product. 6p.—Carpenter Steel Co., Union, N. J. (187L)

Silicone Products

Concerns advantages of using silicone compounds to improve physical qualities of rubber, asbestos cloths, and glass fabrics. Tables list engineering data for various products. 8p.—Raybestos-Manhattan, Inc., Passaic, N. J. (187M)

Deaerating Heaters

Considers operating facts for a line of packaged, deaerating, feedwater heaters, specifically designed for small installations. Chart lists selection data. Technical reprint T-149, 4p.—Graver Water Conditioning Co., New York City. (187N)

Electric Plants

Describes a series of 1-to-8-cylinder air and water-cooled electric generating plants. Capacities of the gas and diesel powered units range from 500 to 50,000 watts a.c. current. Each model is pictured. Catalog A-428, 8p.—D. W. Onan & Sons, Inc., Minneapolis. (187O)

Vari-Speed Transmissions

Gives data on operation and design for a line of variable speed V-belt transmissions. Units provide infinite speed adjustment up to ratios of 10 to 1. Charts lists selection data. 12p.—Maurey Mfg. Corp., Chicago. (187P)

Waste Treatment

Depicts construction and operation of packaged steel and concrete settling tanks for clarifying waste water. Built-in conveyor removes sludge. Bulletin 315-92, 4p.—Chain Belt Co., Milwaukee. (187Q)

PVC Piping, Fittings

Engineering memorandum details corrosion resistance, general properties, and other features for a line of polyvinyl chloride (PVC) pipe, valves, and fittings. Tables list pertinent engineering data. 8p.—Peter A. Frasse & Co., Inc., New York City. (187R)

Power Take-Off Clutches

Comprises all necessary selection facts on horsepower, torque capacities, and dimensions for a 7-model line of friction-type power-take-off clutches. Units range from 95 to 602 hp. Bulletin 308, 8p.—Twin Disc Clutch Co., Racine, Wis. (187S)

Ball-Disk Valves

Concerns construction characteristics and operation of a series of automatic and manual control valves having a unique ball-disk closing design. Numerous drawings illustrate operation, and construction. 20 p.—P. K. Industries, North Arlington, N. J. (187T)

Water Filters

Installation photos, working diagrams, and cut-away views show advantages for a line of vertical and horizontal water filters. Capacities, dimensions, and weights are tabled. Bulletin WC-107A, 12p.—Graver Water Conditioning Co., New York City. (187U)

Vacuum Pumps

Pictures show a series of air-cooled high-vacuum pumps, ranging from ¼ to 3 hp. Air displacement capacities from 2 to 46 cfm. Bulletin 403, 4p.—New York Air Brake Co., Kinney Mfg. Div., Boston. (187V)

MAINTENANCE

Machining Stainless Steel

Bulletin gives pertinent tips on methods for machining stainless steel tubing and pipe. Drilling, threading, reaming, milling and sawing operations are briefly discussed. Bulletin TGC 182, 4p.—*Babcock & Wilcox Co., Beaver Falls, Pa.* (187W)

Mechanical Seals

Drawings, diagrams, and tables illustrate operation and advantages for a line of corrosion-resistant mechanical seals for use on rotary equipment. Bulletin S-205-2, 8 p.—Crane Packing Co., Morton Grove, Ill. (187X)

Pump Parts

Depicts a variety of leather, rubber, felt, and metal parts for hydraulic and pneumatic pumping systems. Covered are packings, sealing materials, and diaphragms. 16 p.—Chicago-Allis Mfg. Co., Chicago. (187Y)

Boiler Cleaner

Gives detailed instruction on addition of a hydrazine compound to boiler water for deaeration and cleaning. Diagrams illustrate equipment hook-ups. 4p.—Olin Mathieson Chemical Corp., Baltimore. (187Z)

Locking Screw

Describes unique features of a new-type self-locking screw that replaces conventional nuts, bolts, and cotter pins. The flush-mounting unit is held in place by a spring key. 4p.—Bellford Metal Products Co., Cleveland. (187AA)

How to Install Pipe

Ring-bound guide gives all details for installation of manufacturer's Transite piping for overhead, pressurized water and process lines. Cutting, hanging, supporting, and bracing are some of many operations covered. 48 p.—Johns-Manville, New York City. (187BA)

Steam Cleaners

Pictures and describes features of a portable steam-cleaning device and a pressurized hot water cleaner. Units develop steam pressure by electric means, thus reduce fire hazards. Bulletin JC-100, 6p.—Pantex Manufacturing Corp., Pawtucket, R. I. (187CA)

Custom-Made Packing

Specifies a line of pre-formed valve-stem packings available in braided asbestos yarn and plastic materials. Selection chart lists sizes and shapes most commonly used. 4p.—Raybestos-Manhattan, Inc., Passaic, N. J. (187DA)

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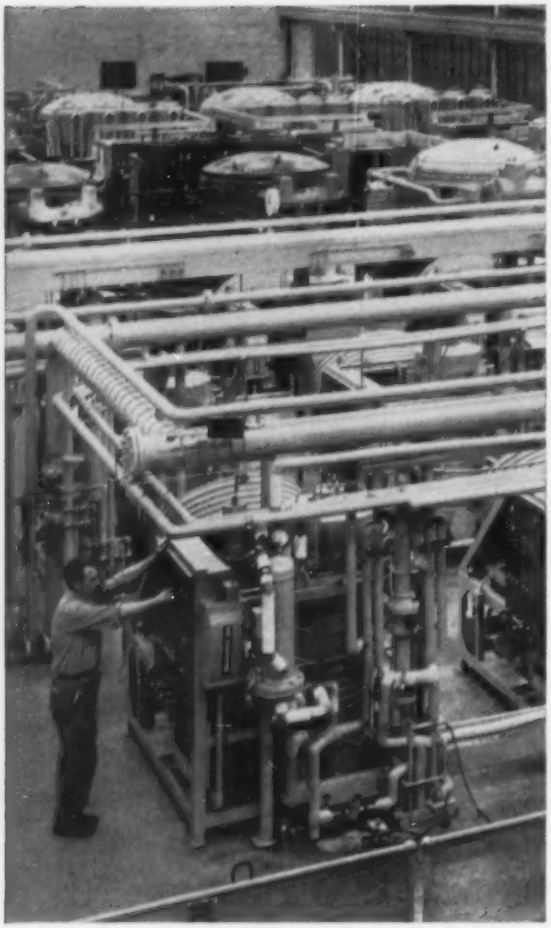

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Lubrication Data Book

Presents facts on wide range of lubricants and how to use them on various food processing machines. Data Book 56-1, 16p.—Fiske Bros. Refining Co., Newark, N. J. (188A)

Efficient Cleaners

Lists 41 maintenance and industrial cleaning jobs that are efficiently handled by the manufacturer's line of compounds. Advantages for each are detailed. Bulletin 67.2, 6p.—Magnus Chemical Co. Inc., Garwood, N. J. (188B)

Adjustable Drains

Treats of advantages for a line of adjustable floor and roof drains. The units permit raising and lowering to eliminate any poor drainage spots. Manual LV, 6p.—Josam Manufacturing Co., Michigan City, Ind. (188C)

Trash Container

Shows way to banish odors and insects from garbage and trash cans by means of an attractive sealed container. Unit holds standard trash can and has flip-type lid. 2p.—Neatway Products, Inc., Minneapolis. (188D)

MATERIALS HANDLING

Tractor-Shovel

Specifies advantages of a powerful tractor-shovel combination, equipped with power-shift transmission and a torque converter. Drawings show dimensions and scoop action. 4 p.—Frank G. Hough Co., Libertyville, Ill. (188E)

LPG Fork Truck

Diagrams and photos illustrate operation of a liquid petroleum gas fueling system for fork trucks. Available on units with capacities from 2,000 to 10,000 lb. Bulletin 5114B, 4 p.—Yale & Towne Mfg. Co., Philadelphia. (188F)

Portable Conveyor

Two leaflets give specifications and uses for a portable, reversible, belt conveyor that can be used in horizontal and elevating applications. Belt speeds available from 48 to 129 fpm. Form 300-56 and 350-56, 4p.—Rapids-Standard Co. Inc., Grand Rapids, Mich. (188G)

PACKAGING

How to Seal Boxes

Pocket booklet gives valuable pointers on ways to cut losses, reduce waste, and speed up and simplify sealing methods for corrugated shipping boxes. Hand and automatic sealing procedures are discussed. Bulletin No. 1, 24p.—Hinde & Dauch, Sandusky, Ohio. (188H)

Colored Stitching Wire

Selection guide contains chips for picking colored stitching wires to dress up shipping containers. Twelve shades available in black, white, blue, green, yellow, brown and red. 1p.—Acme Steel Co., Chicago. (188I)

Suspended Bag Closers

Informs on a line of overhead-hung bag-closing machines available in models handling fabric or paper containers. Spring or counter-weighted suspensions give finger-tip control. Bulletin 201, 4p.—Union Special Machine Co., Chicago. (188J)

Specialty Cans

Data sheet illustrates and describes a variety of specially shaped and sized cans for packaging dry, semi-liquid, and liquid products. Photos show round, slip-cover, friction-top, and screw-top cans, and square cans. Product No. 102, 2p.—George D. Ellis & Sons, Inc., Philadelphia. (188K)

Scalers, Weighers

Pocket folder briefs data on a line of manual check weighing, automatic check weighing, scaling, and batching machines. Form 3305, 6p.—Exact Weight Scale Co., Columbus, Ohio (188L)

Steel-Strapping Catalog

Details wide line of case-strapping equipment and accessories. Covered are methods for reinforcing, palletizing and skidding, bundling, baling, and tieing. Hand and automatic units are depicted. 44p.—Acme Steel Co., Chicago. (188M)

Small-Bag Closing

Portrays machines for sewing closures in small bags at speeds up to 15,000 bags per day. Bulletin 100, 4p.—Union Special Machine Co., Chicago. (188N)

QUALITY CONTROL

Laboratory Line

Considers operation of a series of vacuum ovens, gas analyzers, humidity controls, and other special devices for lab research. Bulletin 56-4-62, 20p.—Burrell Corp., Pittsburgh. (188O)

Infra-Red Measurement

Interesting technical discussion concerns measuring of temperature from remote locations by means of infra red radiometry. Complete information, laws, and formulas explain technique. Techniques, 16p.—Barnes Engineering Co., Stamford, Conn. (188P)

Cocoa Moisture Meter

Concerns fast, simple way of

gaging cocoa moisture content by use of a compact, battery-operated moisture meter. Unit operates on electrical conductivity of cocoa powder, which is always in definite relation to moisture content. 4p. —K. P. Mundinger GmbH, Renningen/Wurtt, Germany. (188Q)

Balance Table

Covers construction features of a vibration and shock-proof table for holding analytical and micro balances. Unit comprises wall-mounted brackets, legs, and a concrete slab. Prices included. 2p.—C. A. Brinkmann & Co., Inc., Great Neck, L. I., N. Y. (189A)

Continuous Refractometer

Describes a compact cabinet unit for continuous measurement of refractive index in process plant, pilot plant, or laboratory. Machine examines flowing sample in process stream, measures difference in refractive index between sample and standard, and provides a signal for recording and control. 8p.—Barnes Engineering Co., Stamford, Conn. (189B)

pH Recorders, Controllers

Reviews basic fundamentals of electrochemical instrumentation and describes a series of instruments for measuring, indicating, and recording such variables as pH, Redox, and conductivity. Catalog 1551, 18p.—Minneapolis-Honeywell Regulator Co., Philadelphia. (189C)

Slow-Speed Stirrer

Leaflet pictures and discusses function of an electric stirring device that eliminates the tedious hand job. Unit is geared to provide constant speed of 78 rpm. Bulletin 738, 2p.—Precision Scientific Co., Chicago. (189D)

Lab Equipment

Details wide line of specialty lab supplies such as sterilizers, glassware washer, steam generator, vacuum pumps, and other useful laboratory tools. *The Palo Retort, 16p.*—Palo Laboratory Supplies, New York City (189E)

Nuclear Instrumentation

Presents line of gages and meters for measurement of radio activity. Laboratory and field units are detailed, and cover a wide range of applications. 4p.—Anton Electronic Laboratories, Inc., Brooklyn, N. Y. (189F)

Varied Lab Instruments

Specifies facts on a line of laboratory balances, refractometers, pH meters and controllers, microscopes, and photomicrography equipment. 4p.—C. A. Brinkmann & Co., Great Neck, L. I., N. Y. (189G)

INGREDIENTS

Flavor Enhancer

Three unusual bulletins describe properties of a monosodium glutamate product and lists 59 recipes for its use. Ajinomoto Co. Inc., New York City. (189H)

Flavor Listing

Latest catalog lists essential oils, aromatic chemicals, and certified colors. It also contains product definitions, descriptions, prices and other pertinent information. 36p.—Dodge and Olcott, Inc., New York City. (189I)

Catalog of Flavors

Concerns wide line of essential oils, extracts, powdered flavors, and other essences for the food industry. 16p.—Felton Chemical Co., Inc., Brooklyn, N. Y. (189J)

TRANSPORTATION

V-8 Engines

Describes design and engineering features of a new, V-8 truck engine. Available models are pictured and specified. Form CR-637-F, 16p.—International Harvester Co., Chicago. (189K)

Truck Refrigeration

Two leaflets detail a continuous, truck refrigeration system that can be used with either hold-over plates or an evaporator-blower. Principal feature is the engine-driven pump that operates at constant speed regardless of truck engine speed. Bulletin C-56B, and C-56P, 4p.—Tranter Mfg. Inc., Lansing, Mich. (189L)

Packaged Refrigeration

Considers features of a packaged electrical truck refrigeration system designed for retail, local delivery and semi-trailer trucks. Pictures show installation and component parts. Catalog GEA-6084 B, 8p.—*General Electric Co., Schenectady, N. Y. (189M)*

INSTRUMENTS

Flowmeter Controller

Refers to applications and features of a positive-displacement flowmeter and pneumatic signal transfer system. Diagrams show how device is used for measuring flow ratio in combustion control, multiple fuel totalization, and interchangeable control of fuel switchover. Device can also be used for proportioning control, mixing, blending and other operations involving viscous fluids. Bulletin 301, 8p.—Askania Regulator Co., Chicago. (189N)

Precision Relays

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ordering specifications for a manually-adjusted precision relay switch, used to open and close one or two control circuits. Bulletin MRM 240, 4p.—Manning, Maxwell & Moore, Inc., Stratford, Conn. (189O)

Protection Device

Concerns a vibration detector which continuously monitors operation of rotating or reciprocating machines. If vibration level exceeds normal amount, a switch shuts down equipment and sounds alarm. Bulletin 500-1A, 4p.—Beta Corp., Richmond, Va. (190A)

Weather Controls

Details series of devices which control building temperatures by charting outdoor conditions. Fluctuations in heat and cold automatically adjust amount of heat generation and rate of flow. Other devices include time switches which are set automatically by outdoor weather. Bulletin C-256, 4p.—Automatic Devices Co. Inc., Western Springs, Ill. (190B)

Armored Controls

Pictures and diagrams illustrate full line of armored rotameters for measurement of high pressure and temperature fluid flow rates. Tables specify selection data. Bulletin 130, 12p.—Brooks Rotameter Co., Lansdale, Pa. (190C)

Heated Gages, Valves

For accurate level readings with viscous liquids, bulletin describes a sight glass and valve combination with built-in electrical heating. Heating element available in 120- or 240-volt a.c. ratings. Bulletin Supplement, 237, 1p.—Jerguson Gage and Valve Co., Somerville, Mass. (190D)

Controlled Cooling

Describes instrument-controlled vacuum cooling system for fresh produce. Preset instrument panel automatically starts and stops vacuum pumps at desired wet-bulb temperatures. Data sheet 3.0-7, 2p. — Minneapolis-Honeywell Regulator Co. Philadelphia. (190E)

Automatic Sampler

Describes fluid-line sampler that takes continuous, intermittent samples of liquids direct from process lines. Wall-mounted timer operates the preset unit which requires no further attention. 2p. — Langsenkamp-Wheeler Brass Works, Inc., Indianapolis. (190F)

Complete Process Control

Article in company magazine details operation and advantages of a trans-scan-log control system that automatically scans and records process variables. *Taylor Technology*, Vol. 8, No. 2.—Taylor Instrument Cos., Rochester, N. Y. (190G)

Electronic Controller

Describes a non-indicating electronic device, used as a single-point controller, differential controller, or cascade controller with one or two sensing bulbs. Pictures, diagrams, and tables provide pertinent data. Specification sheet S-1010-1, 4p.—Minneapolis-Honeywell Regulator Co., Philadelphia. (190H)

Heat Measurement

Details line of pyrometers and resistance thermometers, used for temperature indication and control of industrial processes. Devices can also be employed to measure other variables such as speed, vacuum, and voltage. Units operate over a range of 32 to 120F. Tables list individual scale ranges. Bulletin GEC-1324A, 2p.—General Electric Co., Schenectady, N. Y. (190I)

PROCESSING

Coffee Roaster

Full facts on a gas- or oil-heated automatic coffee roaster. Imported unit controls bean temperature with a thermostatic feeler. Schematic diagram shows installation. Maschinenfabrik Ferd. Gothot, Mulheim-Ruhr, Germany. (190J)

Cane Mud-Filter

Presents characteristics, construction, size, operation, and advantages of a cane-sugar filter. Designed for mud-washing, the vacuum unit has 24 individual filtering sections. Filter tank, automatic valve, filtrate pipes and drive mechanism are detailed. Bulletin 4093, 4p.—Dorr-Oliver Inc., Stamford, Conn. (190K)

Automatic Blenders

Colorful bulletin shows complete setups for automatic blending systems using multiple-metering controls. Selector meters are synchronized and inner-connected for full liquid flow regulation. Six, or even more, units can be combined to handle various ingredients. Fig. 413, 12p.—Bowser, Inc., Ft. Wayne, Ind. (190L)

Can Heater, Cooler

Shows a compact, adjustable, can-heating or cooling unit that transports various-size containers by means of chain conveyors. 4p.—Canning Machinery Co., Glencullen, Oregon. (190M)

Disperser-Homogenizer

Informs on a full line of rotary homogenizers and dispersers that feature triple-grinding in a single-product pass. Units have water-cooled jackets and are available with various types of rotors to meet different grinding needs. 16p.—Tri-Homo Sales Corp., New York City. (190N)

Compact Spray Drier

Concerns space-saving equipment and process for spray-drying powder into a form that disperses readily in water when reconstituted. Pictures show equipment, text describes operation. 4p.—Blaw-Knox Co., Dairy Equipment Div., Mora, Minn. (190O)

Hammer Mill Line

Leaflet gives brief details on a 5-model line of impact-in-air hammer mills. Units are said to reduce friction, and thus heat. Horsepower ratings from 30 to 150. Sheet No. 302, 2p.—Duplex Mill & Mfg. Co., Springfield, Ohio. (190P)

Ribbon Drier

Considers features of a high-speed belt-type ribbon drier, specifically designed for gelatinous products. Special baffles direct high-velocity air blast up and down through product. 8p.—Surface Combustion Corp., Toledo, Ohio. (190Q)

Attrition Mills

Covers use of double-disk attrition mills, available in 4 models, for product grinding. Construction and operation is discussed. Bulletin A-5-A, 4p.—Bauer Bros. Co., Springfield, Ohio. (190R)

High-Tonnage Spray Driers

Photos show installations and component parts of a series of gas- or oil-fired spray driers. Varying designs afford flexibility in meeting different product needs. 4p.—Bowen Engineering Inc., North Branch, N. J. (190S)

MANAGEMENT

Smoking Stations

Leaflet shows design and gives prices for a series of cigarette dunking stations. Units contain signs urging smokers toward better housekeeping and safety. 4p.—Standard Industrial Products Co., Peoria, Ill. (190T)

Noise Analysis

Question and answer treatise discusses problems of noisy areas and the effect of noise fatigue on workers. Various protective devices are pictured and detailed. 16p.—Mine Safety Appliances Co., Pittsburgh. (190U)

SANITATION

Bottle Washing

Discusses use of both balanced bottle washing compounds and those materials designed to be added to caustic solution. Also presented are problems of scale removal, and equipment for controlling solution strength and temperature. 4p.—*Oakite Products*, Inc., New York City. (190V)

This "pedal pusher" gets cans sterile and odorless in just seconds

Invert any mixing can up to 20" in diameter on a Cherry-Burrell Bestov Can Rinser-Sterilizer . . . step on the pedals . . . and seconds later your container is sterilized and odor-free.

Push Pedal 1 and a blast of cold water removes most clinging liquids or waste materials.

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Push Pedal 3 and jets of steam sterilize your cans . . . remove all odors.

For further information, see your Cherry-Burrell Representative or write for literature.

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Temperature Indicating Controllers
Temperature Recording Controllers

The statement is worth repeating. *"Filled system leakage is now a thing of the past!"*

How come? It wasn't come by easily! It required intensive investigation and development here at Weston . . . involving design, materials, dimensioning, finishing, and manufacturing techniques and controls. The result was a new system that is far outperforming any filled system previously known.

The proof? In five long years . . . from the day the new WESTON system was introduced, *no filled system has failed in service*. The development of this new system is one more example of the forward thinking, technical proficiency and production skills that have made Weston world's leader in precise instrumentation. Catalog M2 is available for the asking. *Weston Electrical Instrument Corporation, 614 Frelinghuysen Avenue, Newark 5, N.J.* A subsidiary of Daystrom, Incorporated.

WESTON
Instruments
—TO INDICATE, RECORD, CONTROL

Cradle Bulk Tanks

—Continued from page 90

an excessive number of 400-lb., returnable drums. These were either loaded on boats at Toronto for direct shipment to St. John's (during the 7-months freshwater navigation season) or they are sent by rail to Montreal or Halifix for reshipment by boat.

"Thus we had to tussle with a complicated inventory of drums, difficulties of storing and handling loaded and empty containers in Newfoundland, and all the problems of keying output to steamship schedules and Newfoundland production requirements."

• **In contrast,** the new system trims plant labor costs for handling, filling, washing, and reconditioning drums. Particularly, the heavy volume of manual drum-handling in Newfoundland is eliminated.

And as for drum cost, Mr. Rae thinks experience will show the new containers to be less expensive than the former quantity of small drums.

Tackling the Problem

Even if the St. John's plant stood on an RR siding, Lever couldn't get a tank car to the plant door—for railways in Newfoundland operate on different gage tracks. Hence, there's no car-ferry service.

"We needed a unit," says Mr. Rae, "that could be picked up by mechanical means and that incorporated steam coils for melting out. Further, it had to be suitable for firm, safe holding on the flat cars with a minimum of special equipment. Frankly, no portable box of which we were aware filled all these requirements."

Development of the new container proved to be the answer. The idea for it was originally conceived by Lever's traffic department. Then company engineers designed the unit, and outside fabricators assisted in its completion.

Its details are brought out in the following brief of initial runs:

At Toronto: Units are filled with refined, blended oil product. To facilitate handling, a steel pallet or cradle framework is permanently fitted onto aluminum tank. Also there are chain lugs on sides to simplify moving by lifting equipment.

A Mack-truck-mounted Load Lugger (Brook Equip. & Mfg. Co., Knoxville, Tenn.) places containers on a flat car, then they're securely chained down. CNR cars are fitted with female castings to accommodate four steel casters on each of container cradles. These relieve strain in movement and reinforce tie-down support.

At North Sydney, Nova Scotia: RR crane transfers containers from flat cars to a ferry for trip to Newfoundland port. On arrival, crane again makes switch to rail for trip to St. John's, where hydraulic-lift truck runs containers from rail line to plant.

At plant: Containers are set down at receiving location, and steam and unloading lines are attached. Once content turns liquid, it is run out directly into first stages of production.

Cleaning Is Simple

As for cleaning, Mr. Rae declares that "no special equipment is needed. The containers can be washed out while still hot at the unloading point. And if their lids are securely fastened, they should be clean enough for the next loading."

Railway charges are still under negotiation. But it looks as if CNR will bill by weight, and that there will be a charge for the return of empties to Toronto. Meanwhile, Lever foresees occasional return shipments of whale oil from Newfoundland.

End (Resume reading on page 92)

KEEP ALL YOUR TRUCKS IN SERVICE ALL THE TIME

with Nutting Demountable RUBBER TIRED WHEELS

You don't have to buy expensive complete new wheels when tires are worn! Bolted assembly permits tire replacement in minutes—No special tools!

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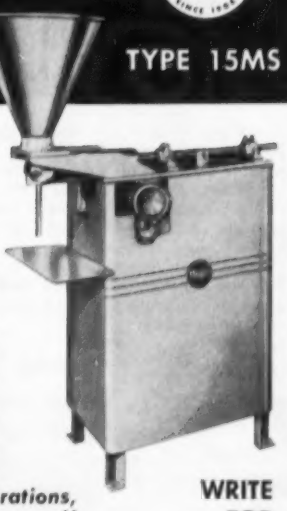
JUNIOR CATALOG 56-G

For details and a representative listing of the most complete floor truck line in America write for Junior Catalog 56-G . . . or consult classified phone directory under "Trucks" or "Casters" for nearest Nutting representative.

SINCE 1891 Nutting TRUCK AND CASTER CO.
3132 DIVISION ST., FARIBAULT, MINN

Export Sales Rep.: SCHEEL INTERNATIONAL, INC., 4261 No. Lincoln Ave., Chicago 18, Ill.

NEW... Hope FILLING MACHINE TYPE 15MS



. . . You can buy several for less than the cost of one big machine

Another first for Hope . . . This new, small, streamlined floor model accurately handles liquid, viscous and semi-solid products quickly and at the lowest possible cost! Excellent for pilot runs, small operations, laboratory testing, small batches and short production runs of a color or product.

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Visit Booth 313, PMMI Show, Cleveland, Sept. 11-14

For more data, circle this page number on card at front →

Dairymen Sift Problems

—Continued from page 89

included, then homogenized at 1,500-2,500 psi. and cooled before using.

13. Creaming Curd. Trend is to cream curd as soon as it is cooled to 40-45F., and package immediately. A dressing of proper fat content, added at a rate to give 4.1% fat in finished cheese, is the only way to meet the required standard.

14. Laboratory tests. Solids, fat and moisture should be checked in the finished cheese, and pH values of water and creamed products should be determined frequently.

Psychrophil counts should be made on water supplies, treated water, and finished creamed cheese once in a while. Shelf life and flavor tests after 5 and 10 days at 45F. should be made regularly. Coliform, yeast and mold counts should be made now and then.

Simpler Cheese Process

A new method for making cheddar cheese from pasteurized milk that requires only 3 hr. and employs conventional equipment with minor changes in hoops and hooping procedure was described by D. C. Mitchell, EURB, Beltsville, Md.

Two starters are used: The conventional lactic, and *S. durans* which is heat- and salt-tolerant. Milk is ripened at 88F. and the curd is cut and cooked at 100F. Whey is drained, curd is salted and hooped at about 110F. in a small volume of either salted whey or salted water, then drained under pressure for a few minutes and pressed overnight in a conventional cheese press.

Body and texture of cheese made by this method are superior to those of high-grade cheese made by conventional method. An excellent, mild flavor develops within 3 months when cured at 55F.

Butter & Butteroil

Results of experiments in which synthetic *B*-carotene was compared with coal-tar dye as colorings for butter were reported by R. R. Riel, Canada Department of Agriculture, Ottawa.

Neither official graders nor a 20-member taste panel could detect any flavor difference in the two products. Acid degree and peroxide and aldehyde values were the same for both types of butter.

Mr. Riel found color intensity of product, judged by Hanson's chart, Richardson's method, or spectrophotometrically, did not vary during 6 months storage at −5F.

Vitamin A potency was increased by an average 3,000 I.U. per lb. as a result of coloring with carotene, and this was not affected by storage.

Greatly increased stability has been obtained through hydrogenation of butteroil in experiments described by H. D. Weihe, EURB, Washington.

Batches (400-500g.) were hydrogenated using 0.5% Raney nickel catalyst under 1 and 2 atmospheres of pressure and temperatures of 125 and 150C. Most extensive hydrogenation was to 20.9 iodine value. After filtering to remove catalyst, oil was heated to 100 F. for 1 hr. at 5 mm. pressure with N_2 gas bubbling through to remove odors.

Fats were recombined with fresh skim milk and homogenized to form whole milks, then canned and stored at −17 C. Flavors of these were rated acceptable for at least 134 days as against less than 1 month for controls.

The hydrogenated, deodorized oils showed increased stability (based on number of days at 55C. required to reach peroxide value of 1) with increase in degree of hydrogenation. At iodine value of 20.6, stability was 6 times that of control.

End (Resume reading on page 90)

IN-BUILT SIMPLICITY...

GUARANTEES

LONG, TROUBLE-FREE SERVICE

Here's the simplest and most efficient pump valve made for reciprocating pumps. The ROYAL CROWN PUMP VALVE has only three separate parts, yet its performance is revolutionary! Valve is guided by a frictionless ball stem which allows it to oscillate and turn with the fluid stream. Swings completely free with each stroke of the pump . . . seating each time in a new position. Resistance to fluid is reduced to a minimum which means greater pump volume at less pump speed. Adaptable to all reciprocating pumps . . . handles all types of liquids.

Royal Crown PUMP VALVES

(A) Round valve surface is streamlined. No obstructions to restrict the flow. (B) Ball-guided valve rotates and swings with each stroke of the pump. Each turn, each swing . . . a lapping action, a continuing perfect seat. (C) Free vertical action assures instant opening and closing. Ball stem is a frictionless guide.

Madsen Works

CONSTRUCTION EQUIPMENT DIVISION
Baldwin-Lima-Hamilton Corporation

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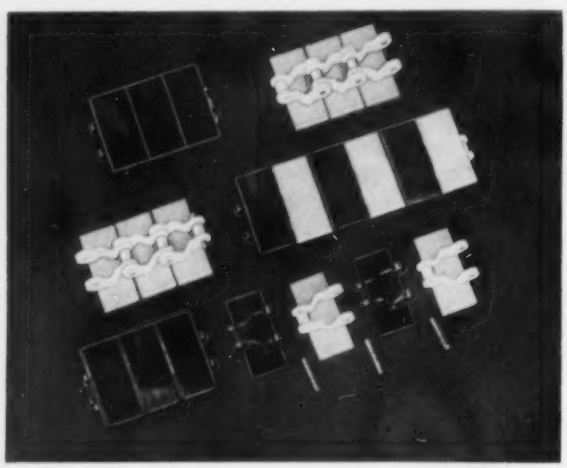

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BLACK CONVEYOR CHAIN MASKS COLOR
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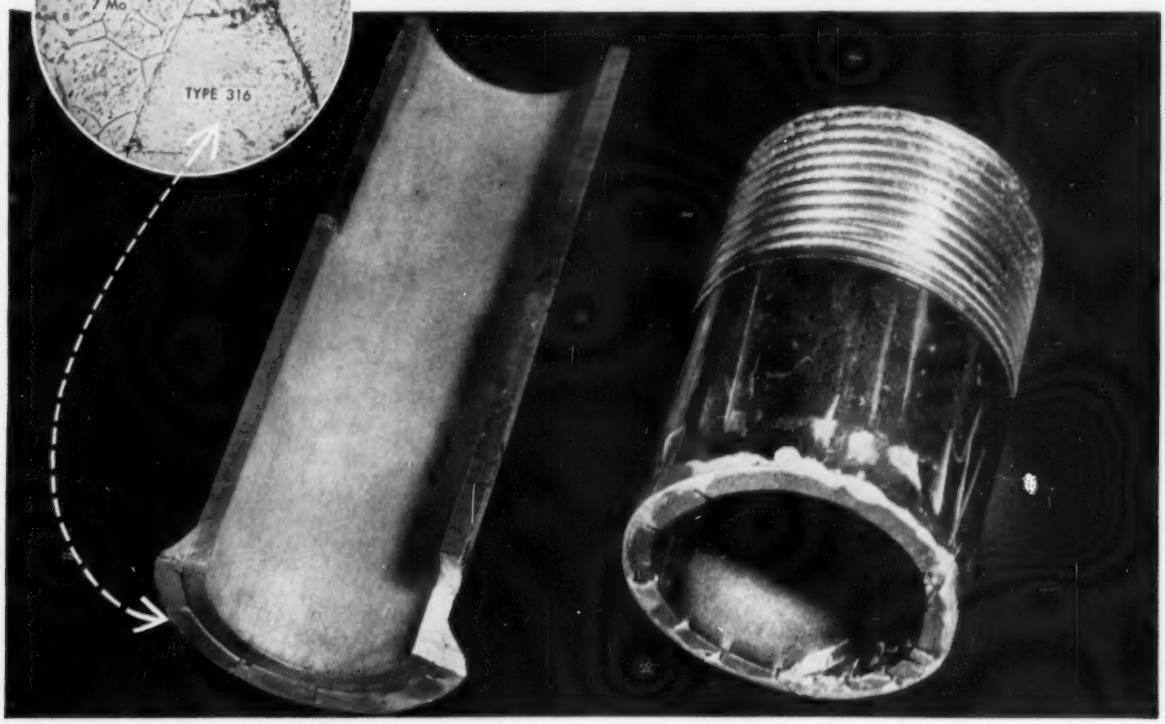

Carpenter 7 Mo Stainless Tubing & Pipe

Take a closer look at the above section of Carpenter 7Mo Stainless Pipe welded to a Type 316 fitting. See how stress corrosion cracking has ruined the fitting, just as it has destroyed the piece of stainless pipe at right.

Note how the cracks in the fitting stop abruptly when they reach the 7Mo pipe. And this pipe has already outlasted three such fittings. The photomicrograph shows the unmistakable proof.

If you have conditions where chlorides, caustic or sulphite solutions are present, Carpenter 7Mo's excellent resistance to general corrosion, pitting and stress corrosion cracking may prove to be a real cost-saver. Let's discuss your particular application now.

The Carpenter Steel Company
Alloy Tube Division, Union, N. J.

Export Dept.: The Carpenter Steel Co., Port Washington, N. Y.—"CARSTEELCO"

Write for this Carpenter 7Mo Technical Bulletin.

Carpenter
Stainless Tubing & Pipe

For more data, circle this page number on card at front →

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Solutions, ideas – the *right* kind for every facet of your plant's operations – at your fingertips. Also information on new equipment, materials, plus many plant problems. How? Keep your copies of FOOD ENGINEERING in smart, *compact* Jesse Jones Volume Files . . . at home, library, plant desk. What's more, copies won't soil, wear, get misplaced. Easily removed for instant use. Each file holds 12 copies.

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CARROT OIL

makes food

golden yellow

Carrot oil, like butter, contains carotene. Carrot oil is extracted from carrots, and each pound contains up to 25 million units of carotene, the international standard of vitamin A.

Carrot oil is preferred for vitaminizing foods because it is a natural vegetable oil and because it contributes vitamin A of high stability and desirable golden yellow color. Carrot oil is not synthetic, does not contain animal fats of any kind, and does not produce fishy flavor.

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New 36-page combined catalog on carrot oil for foods, feeds, and pharmaceuticals. Important reading for most food processors. Write today!

NUTRITIONAL RESEARCH ASSOCIATES
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QUAKER CITY COLD STORAGE CO., INC.
PHILADELPHIA, PA.
3 WAREHOUSE LOCATIONS
Proper Temperature for Frozen Foods

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"Searchlight" advertisements are constantly changing. New opportunities are constantly finding their way into this great Want medium, each issue. Regular reading of the "Searchlight" pages can be as important to you as reading the editorial sections; Editorial matter is NEWS OF OPPORTUNITIES offered in the industry.

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Services in biochemistry, nutrition, food technology, microbiology, food inspection and analysis, toxicology, and insecticide testing.
Write for price schedule
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EMPLOYMENT OPPORTUNITIES

(*Continued on page 198*)

ATTENTION: FOOD TECHNOLOGISTS

Are you making the progress you desire? We are an aggressive organization located in Western New York. We are looking for a man between the ages of 30 and 45, who is capable to improve our line of bulk mixes, Jams and Jellies and develop new items for the baking industry. We are willing to pay extremely well, plus a share in the profits after a reasonable length of time. Please state qualifications and references, marital status, and salary expected. All replies will be held in the strictest confidence.

P-2432, Food Engineering
Classified Adv. Div.,
P. O. Box 12, New York 36, N. Y.

MONEY MAKING LINE FOR EXPERIENCED MAN OR MANUFACTURERS AGENT

New, improved containers for all types food packers either manufacturers or retailers. Fully accepted by trade nationally. Live leads furnished. Commission basis. Give age, experience, lines now carried, territory covered and references, all in strict confidence.

CROUCH DAIRY SUPPLY CO. Inc.
321 So. Main Fort Worth, Texas

REPLIES (Box No.): Address to office nearest you c/o This publication Classified Adv. Div.
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CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post. St. (4)

POSITIONS VACANT

Wanted: Sales Application Engineer and Salesmen with frozen food packaging experience, for large packaging machinery manufacturer. Sales experience not necessary. Mechanical or Industrial Engineering education and experience useful but not necessary. Excellent opportunities for growth and income in expanding field. Principal travel area—Midwest. Contact Food Machinery and Chemical Corporation, Hoopeston, Illinois. ATT: R. F. Hartman, Personnel.

Production manager for new plant in Egypt. 1 or 2 yr. contract as desired. Must be experienced in production of tomato paste and preferably with experience in canning and freezing of vegetables and fruits. Salary and age open, but will pay above U. S. average for right man. Must be available by October 1st, or sooner. Reply to P-2420, Food Engineering.

Foreman for candy manufacturing company located Tidewater, Virginia. Experience with chocolate enrobing and panning essential. Working knowledge of other candies valuable. Must be thoroughly familiar with equipment as well as techniques. Excellent future in old established company for young man with right qualifications. Write stating age, experience, education, references, and salary expected. P-2303, Food Engineering.

(Continued on following page)

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The Advertisements in this section include all employment opportunities—executive, management, technical, selling, office, skilled, manual, etc.

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These positions offer technical challenge under pleasant working conditions in modern facilities in the Detroit area. Excellent insurance, hospitalization and retirement programs.

All replies will be considered promptly and held confidential.

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Necessary requirements are:

1. B.S. — M.S. — or D.Sc. in Chemistry.
2. Food background and experience in canned foods, juices, or preferably, frozen foods.
3. Must be willing to relocate.
4. Detailed resumes must be presented and will be held in strict confidence.

State necessary salary requirements.

P-2375, Food Engineering
Class. Adv. Div. P.O. Box 12, N.Y. 36, N.Y.

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Expanding American-owned pioneer of the sugar industry seeks an imaginative young executive to coordinate industrial engineering activities, services and staff. He will play vital role in further modernization of harvesting methods and the improvement of transportation and loading procedures through mechanization.

Must be stable married man, age 32-38, with I.E. degree plus broad administrative industrial Engineering experience in agricultural type industry. Flexible five figure salary with free housing and other perquisites of overseas living. (Our staff have been told of this opening.)

Describe executive skills when submitting resume and complete earnings record. Include examples of creativity and initiative in your management experience.

P-2567, Food Engineering
Class. Adv. Div., P.O. Box 12, N. Y. 36, N. Y.

CHEMIST

PACKAGING—FOOD

Man for food packaging studies and paper testing project, non-routine. Position to develop into charge of packaging section after preliminary period of adjustment in general laboratory. Some packaging and food analysis exp. helpful.
Substantial company, N.Y.C. All correspondence confidential.

Box 1019, 1474 B'way N. Y.

WANTED
FOOD TECHNOLOGIST

Experienced man to organize and head-up quality control laboratory and procedure for food processing and canning plant that is outstanding in its field. Man we desire should be familiar with flavors and processing of vegetable, fish, and meat products. Excellent opportunity with fast growing concern. Send detailed resume, please. Replies will be held in confidence.

P-2402, Food Engineering
Class. Adv. Div., P.O. Box 12, N.Y. 36, N.Y.

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Established Central New York State food processing industry employing 1,200 people offers opportunity for graduate engineer in its Methods & Standards Department. Diversity of projects in fields of incentives, standard costs and methods and equipment improvement. Minimum one year's experience required. Submit detailed resume to Chief Industrial Engineer, The Nestle Co., Fulton, New York.

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Chemist with food technology training or analytical exp for laboratory position in product improvement work for large food manufacturing co. MIDWEST CITY. Correspondence confidential. Forward full resume. Box 1030, 1474 B'way, N. Y.

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—junior to top-level

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POSITIONS VACANT
(Continued from preceding page)

Industrial engineer position available with nationally known food canner. Prefer college graduate with some experience or with initiative to learn and apply cost and labor saving improvements with individual four-plant management. Mail complete resume qualifications to Production Department, Comstock Foods, Inc., Neward, New York.

EMPLOYMENT SERVICE

Salaried Personnel, $5,000-$30,000. This confidential service, established 1927, is geared to needs of high grade men who seek a change of connection under conditions assuring, if employed, full protection to present position. Send name and address only for details. Personal consultation invited. Jira Thayer, Jennings, Dept. F., P. O. Box 674, Manchester, Vermont.

POSITIONS WANTED

Executive 36 years of age experienced in all phases of candy industry, degree in Food Chemistry, seeks position offering extensive scope and advancement. PW-2451, Food Engineering.

Manufacturing executive—chemist; extensive experience all phases plant operations and customer contact. Meats, meat specialty ingredients, seasonings, binders, emulsifiers. Top man desires more challenge and opportunity. PW-2458, Food Engineering.

Production & research chemist, with extensive experience in manufacture development, control of a wide line of confectionery and chocolate products, desserts, cereal products, and other foods, as well as laboratory direction, desires a position of responsibility. PW-2424, Food Engineering.

PERSONNEL MANAGERS—Need experienced Engineers and Technicians? We offer a booklet especially prepared to help you solve this problem. Write for your "free" copy of "Reservoir of Engineers and Technical Men." Searchlight Dept.—Food Engineering, 330 W. 42 St., New York 36, N. Y.

Manufacturer's Representative,
Chemist, well established,

seeks additional representation of reputable Food raw material or supply firm. Chicago and Middlewest.

RA-1336, Food Engineering
520 N. Michigan Ave., Chicago 11, Ill.

CLASSIFIED SEARCHLIGHT SECTION ADVERTISING

BUSINESS OPPORTUNITIES — EQUIPMENT - USED or RESALE

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FOR SALE

S/S TANKS, 500, 650, 2250, 2800, 3000 GALLONS.
S/S TRUCK TANK, 2,500 GAL., 3 COMPT.
DOUBLE DRUM DRYERS, 24" x 36", 32" x 100", 32" x 120".
S/S HEAT EXCHANGERS AND PREHEATERS TO 150 SQ. FT.
S/S VACUUM PANS, 30", 48", 72".
S/S JACKETED RIBBON TYPE BLENDER, 600 LBS.
S/S 200 GAL. KETTLES, STEEL JACKETS.
STRUTHERS-WELLS S/S MIXING CUBE TUMBLER, 5000 LBS. WORKING CAPACITY. EXCELLENT OFFERING.

BEST EQUIPMENT COMPANY
617 Davis Street — Evanston, Illinois
DAvis 8-0926

FOR SALE

2—Buflovak 42 x 120" double drum dryers, motor driven
1—Fitzpatrick model K comminuter
1—150 sq ft single effect monel evaporator

CHEMICAL & PROCESS MACHY. Corp.
52 Ninth Street — Brooklyn 15, N. Y.

BOILERS

HI-PRESSURE

Complete stock from 10-2,000 h.p.
Nation's largest inventory, New & Used

WABASH POWER EQUIPMENT
31 E. CONGRESS, CHICAGO 5, HA 7-4855

WANTED FILTER

for fruit juices. approx 5-10 g.p.m. Also 4 spout or larger filler for jellies. State price, model, location etc. in reply.

W-2472, Food Engineering
Class. Adv. Div., P.O. Box 12, N.Y. 36, N.Y.

WANTED TO BUY

One small unscrambling table and one automatic #28 screw capper.

DELAWARE PUNCH SYRUP CO.
8047 HARRISBURG — HOUSTON 12, TEXAS

WANTED
GUMP AUTOMATIC NET WEIGHER MODEL B-2, WITH LOADER.

FOOD DISTRIBUTORS INC.
12740 Mansfield — Detroit 27, Michigan

If there is anything you want that other readers can supply
OR . . . something you don't want— that other readers can use—
Advertise it in the
SEARCHLIGHT SECTION

• • • • IN STOCK AT LOEB'S • • • •

Cappers: Capem, Titecap, Swanson, U. S. automatic and semi-automatic
Centrifugals: Fletcher 12" copper, 20" lith-coated, Tolhurst 26" copper.
Clarifiers: De Laval model 84-51.
Conveyor, port. Rapid Standard, 16' lg.
Cutter, Bone: Wausau, 5hp.
Cutters, silent, Buffalo 32" and 43".
Demineralizer: Barnstead 80 GPH.
Disintegrator: Rietz RD-18 st. steel, 75 hp.
Dryer: Devine 2 x 4' vac. drum, st. steel.
Dryers: vacuum shelf, Devine 20 shelf.
Dryer: Bowen lab. spray, st. steel.
Dryer: Direct Heat 4' x 20'.
Dryer: Stokes rotary vacuum 2½ x 8'.
Extractor: Troy 26" monel basket.
Fillers, liquid: Peerless 6 valve, Cass gross weight, siphon and vac. types.
Fillers, piston: Stokes, Colton, Elgin, Filler Machine Co. for jars, tubes.
Fillers, powder: Speedee, Triangle, Stokes & Smith, Ferguson, Gump.
Filter Presses: Sperry, Shriver 6"-36", recessed and plate and frames types.
Filters: int. pressure—Alsop, Sparkler, Lomax, Industrial, Sweetland.
Filter, vacuum: Oliver 2½ x 1'.
Homogenizer: 2-1200 GPH. Union, 300 GPH. Union, 125 and 400 GPH. Gaulin.
Kettle: Dopp 150 gal., jkt., agitated.
Kettles, Stainless steel 5 to 300 gal., with and without agitators, aluminum 40 to 100 gal.
Labelers: Burt, Knapp, New Jersey, World. Ermold—auto and semi-auto.
Mills, hammer: Mikro, 2DH, 2TH, Gump #1, Prater, Raymond, Jay Bee, Jeffrey 30 x 24", Williams #2 and BX.
Colloid: Charlotte st. steel 1 hp., iron 25 hp.
Mixers: Dough type single and double arm, 5 to 100 gal.
Powder: 50 to 2000 lb. capacity.
Portable Electric: ¼ to 5 hp.
Pasteurizer: Wallace-Walker plate type, 200 GPH, st. steel.
Pumps: Centrifugal, rotary, gear, vacuum, all types and sizes.
Reactors: 200 gal. st. steel and 18 x 60".
Screens: Rotex 20 x 48", 42 x 84", 18 x 50", Selectro 4 x 10' Abbe Blutergass #21.
Sealers, carton: Ceco, Triangle, Packomatic.
Sterilizers: Climax 20" x 36" jacketed.
Still, water: Barnstead 75 gal.
Tablet Presses: single punch and rotary.
Tanks: Glass lined, various sizes. Stain. steel 25 gal. to 1200 gal.

Send us your inquiries and list of idle equipment

LOEB EQUIPMENT SUPPLY CO.

820 West Superior St. — Chicago 22, Ill.
Telephone Seeley 8-1431 — Our 31st Year

FOR SALE

Tubular Heat Exchanger, 24—1"x10' S.S. Tubes.
100 to 400 gal. S.S. Mix Tanks, water jkt.
250 gal. Vert. S.S. Tank, insul., agit.
330 gal. S.S. Tank, 45"x48", side agit.
500 gal. Pfaudler G.L. Tank, jkt., T.C. Coil.
36" & 60" S.S. Vacuum Pans.
125 to 1500 gal. Homogenizers or Viscolizers.
3000 gal. Horiz. Glass Lined Tanks, agit.
1/2 & 1/3 H.P. Lightnin Portable Mixers.
1½" Stainless St. Cent. Pump, 2 H.P.
#10BB Waukesha Pumps, 1 H.P.
#25BB Waukesha Pumps, 1 H.P.
50 gal. S.S. Premixer (Tank), side agit.
26" Vercione Centrifugals, copper baskets.
Hobart Grinder, 1½ H.P.
Little Giant Ice Breaker, 1 H.P.
Milk Pasteurizers, Coolers, Fillers, Washers.

Send us your inquiries

LESTER KEHOE MACHINERY CORP.
1 East 42nd Street — New York 17, N. Y.
Murray Hill 2-4616

HERE'S THE BEST!

3—Day 15 gal. Pony Mixers, m.d. S.S. cans.
1—Stainless Steel Hersey Rotary Dryer, 5'x36'.
3—Buflovac 42x120, 32x120 Atmos dbl. Drum Dryers, complete; 1—American 24x36.
2—64"x70" and 1—40"x60" Bird Continuous Centrifugals, S/S Solid bowls.
1—Unused #12 Sweetland FILTER, 48 bronze monel covered bottom drainage leaves 3" o/o. latest type; 1—#2, 23 copper leaves 1½" o.c.
1—Day #30 Imperial jack. Mixer, 75 gal.
9—Sperry 18x18" Filter Presses, 11 ch.
5—Horiz. Dry Powder Ribbon Mixers. 4000#, 1500#, 500#.

OUR 39TH YEAR

Consolidated Products Company, inc.
158 Observer Hgway, Hoboken, New Jersey
Tel.: HO 3-4435 • N. Y. Tel.: BA 7-0600

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MRM 12 spt. SS Straight Line Vac. Filler
Capem 8IF Auto. Capper, up to 88 mm
Elgin Piston Fillers, SS, 1 & 2 spouts
Resina Cappers, single & twin heads
Mikro Pulverizers #1-2-3 & 4
2 Pony Labelers 86MXX and 86ML
Biner Ellison Model 16-Q Filamatic
2 Rotex Sifters 40x84" & 60x120"
New 86 Sturtevant #7 Rotary Blender
Wrap Around Labelers, All Makes & Sizes
MRM 12 spt. SS Rotary Vacuum Filler
World Twin Turret Labeler, 120 per min.

NEW—STEEL & S/S MIXERS, KETTLES, TANKS & DRYERS. Fabricated to Your Specifications. Engineering Advice Available.

We Buy Complete Plants or Single Units What Have You For Sale?

YOU CAN BANK ON

EQUIPMENT CLEARING HOUSE, INC.
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SOuth 8-4451—4452—8782

3—1500 gal. S.S. tanks type 304, 84" dia. x 60" depth flanged and dished bottoms—polished
4—500 gal. S.S. tanks type 304, 52" dia. x 60" depth, flanged and dished bottoms—polished

Priced to sell! — Museum 4-3380

ACE PROCESSING EQUIPMENT CO.
6823 S. Kenwood Ave. — Chicago 37, Ill.

UNION

Rebuilt Machinery

Established 1912

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At Bargain Prices

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Baker Perkins 50 gallon capacity Stainless Steel Steam Jacketed Heavy Duty Mixers with Stainless Jacketed Blades, motorized power tilting, motor driven.

Baker Perkins Model 16-RNM2 150 gallon working capacity Steam Jacketed Mixers, Vacuum Dome, Steam Cored Jacketed Sigma Blades, Bottom Discharge, Large Manhole Openings.

W & P 200 gallon Heavy Duty Mixer, tilting type, with Sigma Blades.

3500 gallon working capacity Steam Jacketed Double Arm Mixing Tanks for mixing, storing or processing of your materials.

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Filler, Hope, Elgin S. S. Piston Fillers.

Elgin 24-Head Rotary Vacuum Filler.

Resina LC Automatic Capper.

Capem 4-Head Capper.

S. & S. G1, G2, G6, HG88 Auger Fillers.

Triangle Package Models U1, A3, A1C, G2C, A6CA Elec-Tri-Pak Fillers.

WRAPPERS

Stokes & Smith B and BB Auger Transwraps.

Doughboy and Pack Rite Automatic Rotary Bag Sealers.

Standard-Knapp No. 429 Carton Sealer.

Hayssen, Package Machy. Co. FA, FA4, DF, CA2, Miller, Scandia and Oliver Automatic Cellophane Wrappers.

Hudson Sharp Campbell Automatic Wrappers, Models 2W6, 2W8 and 2W10.

Forgrove Model 26D Foil Wrapper with underneath fold and adjustable jaws.

LABELERS

Burt and Knapp Adjustable Wraparound Labelers.

Pony late style ML Labelrite.

MISCELLANEOUS

Sanders 20 HP Meat or Fruit Grinder.

Brown PFM Automatic Bag Filling Machine.

Fitzpatrick "D" S. S. Comminuter.

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Charlotte 3 HP Monel Colloid Mill.

Stokes D, DDL and RBB Tablet Machines.

Colton 2RP and 3RP Rotary Tablet Machines.

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Write, Wire, Phone For Details and Prices
Act Now For Choice Selection

TOP PRICES PAID FOR YOUR SURPLUS EQUIPMENT

UNION STANDARD EQUIPMENT CO.

318-322 Lafayette Street
New York 12, New York
Phone: Canal 6-5334

FOR SALE

1—Niagara type 316 Stainless Steel Pressure Filter, model 510-26, 500 sq. ft.

1—Alsop SD-6-WR-10 Jacketed Stainless Steel Filter.

10—Shriver & Sperry Filter Presses.

1—American 42 x 120 Double Drum Dryer (from Dairy).

1—Buflovak 32 x 52 Double Drum Dryer (from Dairy).

1—Bowen 5' dia. Spray Dryer, St. St.

1—Spray Dryer 19' dia., St. St.

2—Rotary Steam Tube Dryers, 4' x 30'; 6' x 30'.

1—Stokes Type 316 St. St. Double Effect Water Still, 250 GPH.

1—Stokes St. St. 150 gal. Jacketed Vacuum Still.

1—Buflovak #6.5 St. St. Double Effect Evaporator, suitable for Whey.

1—Conkey Triple Effect Evaporator, Silicon Bronze, 1900 sq. ft.—UNUSED.

2—Fitzpatrick Comminutors, St. St., models F & K.

4—Mikro Pulverizers—#2-DH, #2-TH, #3-TH.

2—St. St. Selectro Screens, 2' x 7', two-deck, enclosed.

30—Stainless Steel Tanks—30 gal. to 10,000 gal. sizes.

75—Welded Steel Tanks—Brewery lining.

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PERRY EQUIPMENT CORP.

1411 N. 6th St., Phil. 22, Pa. Phone: STevenson 4-7210

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. . . IS THE BEST BUY

SPECIALS

2—Baker Perkins 100 and 50 gal., 316 S.S. Sigma Blade, jacketed Mixers.

1—L. B. 208 ton Jet Refrigeration Unit.

1—Buflovak 32x120" double drum Dryer.

1—Buflovak 6' x 5'6" Monel, single drum Flaker.

1—Link Belt 5'2" x 20' steel Roto-Louvre Dryer.

1—Hersey 18"x12' Hot Air Rotary Dryer 304 S.S.

3—Eimco 18"x24", 18"x12", 316 S.S. Rotary Vacuum Filters.

2—Bird 24"x38", 18"x28", 304 S.S. solid bowl, Continuous Centrifuges.

3—Bird 40" 347 S.S. & Fletcher 30" 304 S.S. Suspended Centrifugals.

2—Sharples Super-D-Hydrators type C-20 & C-27 S.S.

4—Sweetland Filters #3, #5, #7, #12.

6—Day "Cincinnatus" Sigma Blade Mixers 600, 200 and 100 gal.

1—#2TH Mikro Pulverizer, 7½ HP motor.

2—Rotex Sifters 40"x120", 40"x84".

BRILL EQUIPMENT COMPANY

2401 Third Ave., New York 51, N. Y.
OR
4101 San Jacinto, Houston 4, Texas

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MODERN PACKAGING EQUIPMENT

KARL KIEFER 24 Head Fully Automatic, Stainless Steel Vacuum Fillers.

CAPEM 4 and 3 Head Fully Automatic Cappers.

The above machines are in practically new condition.

PNEUMATIC SCALE COMPANY Cartoning Line, Consisting of: Automatic Feeder, Bottom Sealer, Filler, Top Sealer & Compression Unit.

PNEUMATIC SCALE COMPANY Tightwraps, High Speed.

PNEUMATIC SCALE COMPANY, WORLD and PONY fully automatic and semi-automatic Labelers, 60-120 per minute.

STOKES & SMITH Model D Neverstop.

STOKES & SMITH Model H.G. 84, G, and GD Auger Fillers.

STOKESWRAP Model A with electric eye, counter, stainless steel auger filler.

PACKAGE MACHINERY CO Model FA & FA2 Wrappers.

Partial List—send for complete list of equipment in stock.

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PNEUMATIC SCALE Large Liners
All Types of Bottling and Cartoning Equipment
PACKAGE MACHINERY CO. Model FA or FAQ Cellophane Wrappers.
Will Buy Single Machines or Entire Plants

ALLIED EQUIPMENT CO.

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Phone: Yonkers 5-0442

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Moving to our new location. Fillers, cappers, labelers, agitators, stainless steel tanks, stainless steelware, sanitary fittings, case sealers, conveyors, etc.

ACE

637 E. 71st St. Chicago 19, Ill.

THE MACHINERY & EQUIPMENT CORP.

293 Frelinghuysen Ave. Newark, 5, N. J.
TAlbot 4-2050

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Serving THE FOOD and CANNING INDUSTRY for over 20 years with the best in USED and REBUILT PROCESSING and PACKAGING EQUIPMENT.

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Complete Plants For Sale

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DRYERS; send for complete list.

FILLERS; For Liquids, Semi-Liquids, Pastes, Powders, Crystals, etc. Karl Kiefer, Stokes & Smith, Triangle, Food Machinery Co., Filler Machinery Co. and other standard makes for all filling purposes; Semi and Fully Aut.

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LABELERS; Semi and Fully Automatic Units by World, Ermold, New Jersey, Pneumatic Scale, and others; Please submit labelling problem for exact recommendations.

MIXERS; NEW Falcon Ribbon Mixers in Steel or Stainless Steel, all sizes; Portable Agitators, Mixing Tanks; Heavy Duty Dough and Mass Mixers, Double Arm, Jacketed or Unjacketed. Send for complete List of Availables.

KETTLES, TANKS, VACUUM PANS, REACTORS; In Stainless, Steel, Copper, Nickel, Monel and Iron; send for complete list of our large stock.

EVAPORATORS, STILLS, COLUMNS by Buffalo, Swenson, Blaw Knox, Zaremba and others in all wanted metals.

JUST ARRIVED IN STOCK

2 Stainless Steel 5000 Gal. Mixing Tanks
Gemco Tumbling Batch Mixer; 30 cu. ft.
Double Door Gas Heated Oven; 36"x30"x21½"
Sparkler No. 18-12 Jacketed Filter S/S
2 Anderson "Red Lion" Oil Expellers
Sprout Waldron Monarch Rot. Cutter with 5 Knives 30"; 15 H.P. Motor
Baker Perkins Heavy Duty Dbl. Arm Jkted Mixers; 100 Gal. to 500 Gal.

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BROOKLYN 15, N. Y.
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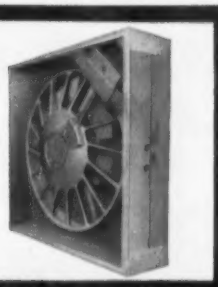

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HEAVY DUTY INDUSTRIAL MODEL
ENCLOSED WEATHER PROOF MOTOR
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Model 1-1781Y framed Unit—4 H.P.—220 Volt—60 Cycle Single Phase—1200 RPM

#1—1450Y Unframed Unit—4 H.P.—220 Volt—60 Cycle Single Phase—1200 RPM

Framed Fan—Mounting Frame Outside Dimensions: 45⅛" x 45⅛" x 11-9/16"—Wt. 484 lbs.

Unframed Fan 39" diameter belt circle—40¼" over-all diameter—11¾" over-all width—Wt. 400 lbs.

Suitable for either Horizontal or Vertical Mounting. May be used either as blower or exhauster.

Installation information, complete maintenance, operation and instruction manual with each fan.

ORIGINAL SELLING PRICE $545 each
OUR PRICE 1-5 $275 EACH
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INDUSTRIAL EQUIPMENT DIVISION OF
LURIA BROTHERS & COMPANY, INC.
PHILADELPHIA NATIONAL BANK BLDG.—PHILADELPHIA 7, PA.—Rittenhouse 6-7455

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FOR SALE: Two Link Belt Stainless Steel 316 continuous mixers, jacketed, 18" x 18" x 12' long. Eight mixers, 7500—3000—2000—400—100 lbs. Some jacketed.

CHEMICAL & PROCESS MACHINERY CORP.
52 Ninth Street Brooklyn 15, N. Y.

FOR SALE

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100 gal. Copper Steam Jacketed Mixing Kettle
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Burns Split Nut Peanut Blancher

SAVAGE BROS. CO.
2636 Gladys Ave. Chicago 12, Ill.

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- Refrigeration
- Univats
- Slicers and Slicing Machinery
- Fruit Strainers
- Kettles
- Whippers
- Nut Choppers and Grinders
- Molds
- Variegators
- Baggers and Bagging Machines
- Bottle Washers
- Cup Dispensers and Cappers
- Wire Baskets
- EDM Equipment
- Scales
- Slab Fillers
- Thermometers and Recorders
- S.S. Tables
- S.S. Pumps of all types
- S.S. Pipe and Fittings
- Electric Motors and Gear Reducers of all sizes

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RUDERMAN MACHINERY EXCHANGE
GOUVERNEUR, NEW YORK Telephone: 333-334

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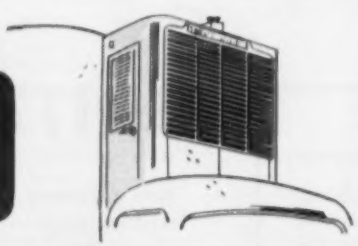

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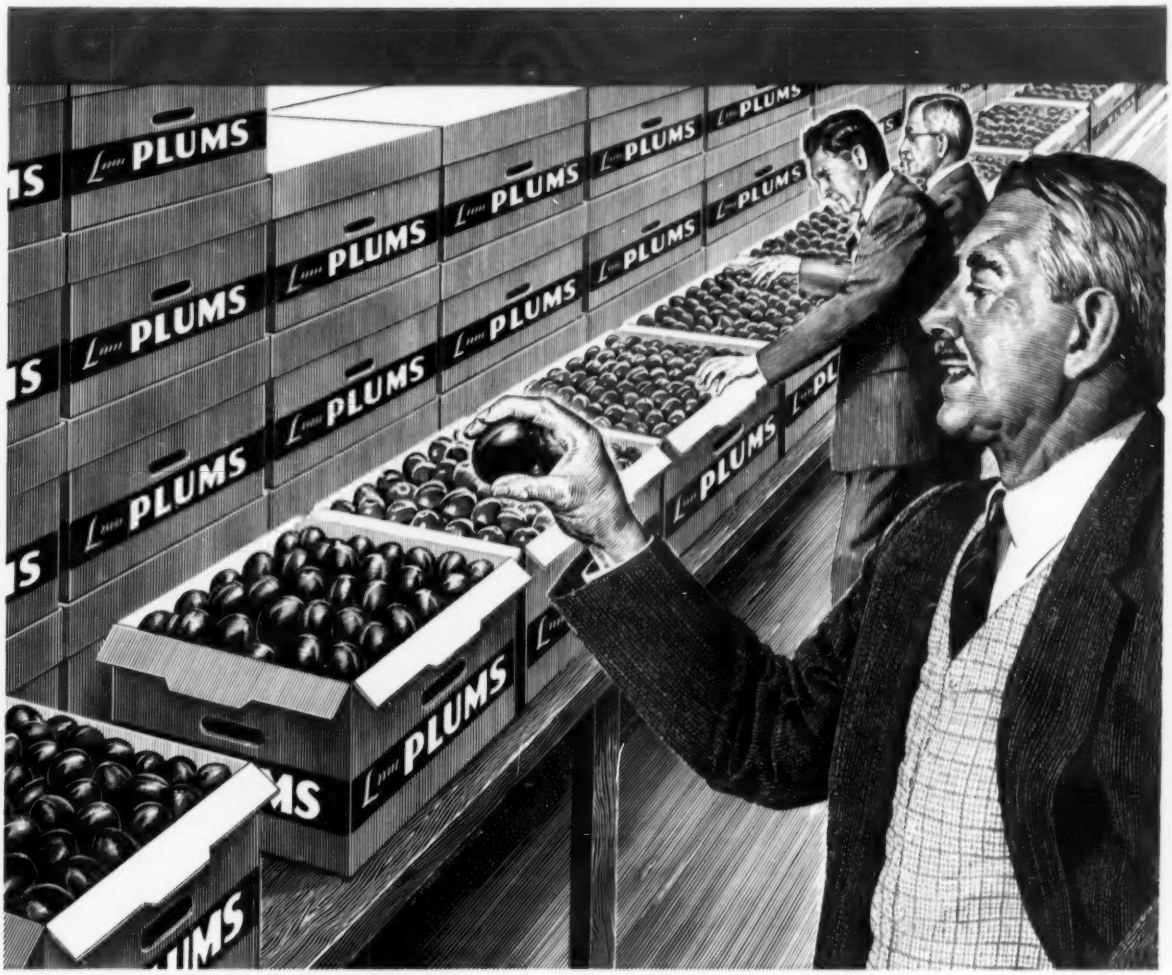

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